



Mellanox MLNX-OS® User Manual for VPI

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Document Revision History

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 3.60	05 March, 2015	Added: • MLAG configuration Step 10 • The command “system-mac” on page 554 • The command “upgrade-timeout” on page 555 • Section 5.6.4, “BPDU Guard,” on page 579 Updated: • MLAG configuration verification Step 1 with system MAC and upgrade time-out • The command “show mlag” on page 556 • Table 51, “Supported VLANs by RPVST per Switch System,” on page 581
Rev 3.50	24 February, 2015	Added: • the command “show version concise” on page 402 Updated: • the command “show uboot” on page 403

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 3.40	11 February, 2015	Added: • “List of Tables” and “List of Figures” Sections • Updated Section 2.4, “Licenses,” on page 39 • the command “license delete” on page 46 • the command “license install” on page 47 • the command “telnet” on page 89 • the command “terminal” on page 69 • the command “web cache-enable” on page 93 • the command “ip default-gateway” on page 113 • the command “boot bootmgr password” on page 190 • the command “boot system” on page 192 • the command “configuration write” on page 228 • the command “logging trap” on page 248 • the command “email autosupport enable” on page 275 • the command “email autosupport event” on page 276 • the command “crypto ipsec ike” on page 341 • Section 4.20, “Back-Up Battery Units,” on page 492 • the command “lACP-individual enable” on page 526 • the command “show interfaces port-channel” on page 533 • the command “show interfaces port-channel compatibility-parameters” on page 534 • the command “show interfaces port-channel load-balance” on page 535 • the command “show interfaces port-channel summary” on page 536 • Section 5.6.8, “RPVST,” on page 580 • the command “spanning-tree vlan forward-time” on page 602 • the command “spanning-tree vlan hello-time” on page 603 • the command “spanning-tree vlan max-age” on page 604 • the command “spanning-tree vlan priority” on page 605 • the command “show spanning-tree vlan” on page 611 • Section 6.2, “IPv6,” on page 752 • the command “auto-cost reference-bandwidth” on page 791 • the command “ip sm allow-both-pkeys” on page 1016 • the command “show ip multicast interface proxy-arp” on page 1253 Updated: • Section 2.3, “Starting the Web User Interface,” on page 36 • the command “image options” on page 198 • the command “reload” on page 208 • Section 4.8.2, “Remote Logging,” on page 232 • the command “logging debug-files” on page 235 • Section 4.9.1, “Commands,” on page 252

Table 1 - Document Revision History

Document Revision	Date	Description
		• Section 4.12.2, “User Accounts,” on page 297 • the command “username” on page 299 • the command “aaa authentication attempts track” on page 306 • the command “radius-server host” on page 318 • the command “tacacs-server host” on page 322 • Table 30, “System Health Monitor Alerts Scenarios,” on page 381 • the command “snmp-server auto-refresh” on page 435 • the command “snmp-server user” on page 445 • the command “show interfaces ethernet [<inf>] description” on page 514 • the command “show interfaces ethernet [<inf>] status” on page 515 • the command “show interfaces port-channel summary” on page 536 • the command “show interfaces mlag-port-channel summary” on page 559 • the command “spanning-tree mode” on page 584 • the command “show spanning-tree” on page 606 • the command “show spanning-tree detail” on page 607 • the command “show spanning-tree interface” on page 608 • the command “show spanning-tree mst” on page 609 • the command “show spanning-tree root” on page 610 • Section 5.8.2, “Defining a Multicast Router Port on a VLAN,” on page 621 • the command “dcb application-priority” on page 649 • the command “dcb priority-flow-control enable” on page 668 • Section 5.13.1, “Flow Samples,” on page 699 • the command “ip arp timeout” on page 744 • the command “redistribute” on page 793 • Section 7.3.2, “High Power Transceivers,” on page 999 • the command “ib sm root-guid” on page 1049 • the command “defmember” on page 1128 • the command “member” on page 1129 • the command “rate” on page 1132 • the command “ib qos level” on page 1144 • Chapter 8, “Gateway” on page 1190 • the command “show interfaces proxy-arp ha multicast-list” on page 1255
Rev 3.30	19 November, 2014	Added: • Section 5.1.4, “High Power Transceivers,” on page 502 • Section 7.3.2, “High Power Transceivers,” on page 999 Updated: • the command “web https” on page 100 • the command “show interfaces ethernet” on page 511 • the command “show interfaces ethernet [<inf>] transceiver” on page 516 • the command “dcb application-priority” on page 649 • the command “show interfaces ib” on page 1008 • the command “show interfaces ib transceiver” on page 1010 • Section B.6, “HTTPS,” on page 1273 • Section B.8, “Password Hashing,” on page 1276

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 3.20	09 November, 2014	Added: - MAC addresses note in Section 4.4, “Virtual Protocol Interconnect (VPI),” on page 172 - Section 4.19, “Virtual Machine,” on page 468 - Section 5.5.2, “MAC Learning Considerations,” on page 571 - the command “mac-learning disable” on page 574 - Section 6.1.3, “IPv4 Routing Mode,” on page 722 - Appendix B, “Strict Security Mode,” on page 1271 Updated: - Section 1.2, “Ethernet Features,” on page 26 - Section 3.2, “Web Interface Overview,” on page 55 - the command “reset factory” on page 209 - Section 4.17.1.7, “SNMP SET Operations,” on page 429 - the command “interface port-channel” on page 520 - the command “show lacp interfaces neighbor” on page 529 - Section 5.3, “MLAG,” on page 537 - the command “mlag-channel-group mode” on page 551 - the command “show mlag statistics” on page 560 - the command “ip icmp redirect” on page 733 - Section 6.4, “BGP,” on page 822 - Section 6.7.2, “Configuring VRRP,” on page 962 - the command “show fabric” on page 996 - the command “proxy-arp ha” on page 1211 - Appendix A, “MEX6200 System,” on page 1256 Replaced: - the command “show lacp interfaces port-channel” with the command “show lacp” on page 531 - the command “show lacp system-identifier” with the command “show lacp interfaces system-identifier” on page 532
Rev 3.10	20 July, 2014	Added: - Section 5.14, “Transport Applications,” on page 714 - Section 6.1.1, “IP Interfaces,” on page 718 - Section 6.4, “BGP,” on page 822 - the command “show ip pim upstream joins” on page 942 Updated: - Chapter 1, “Introduction” on page 25 - Section 4.17.1.8, “IF-MIB and Interface Information,” on page 433 - Section 4.17.2, “XML API,” on page 434 - MAC addresses note in Section 5.3, “MLAG,” on page 537 - Chapter 6, “IP Routing” on page 718 with the appropriate configuration modes for the new configuration contexts and commands added - the command “route-map” on page 883 - the command “continue <sequence-number>” on page 884 - the command “abort” on page 885 - the command “exit” on page 886 - Section 6.6, “Multicast (IGMP and PIM),” on page 915 - the command “ip pim join-prune-interval” on page 931 - the command “show ip pim bsr” on page 936 - the command “show ip mroute” on page 946 - CPU type note in Section 7.5, “Subnet Manager (SM) High Availability (HA),” on page 1153

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 3.00	05 June, 2014	Updated: - Section 6.6, “Multicast (IGMP and PIM),” on page 915 - Section 6.7.3, “Verifying VRRP,” on page 963
Rev 2.90	19 May, 2014	Added: - Section 4.17.1.8, “IF-MIB and Interface Information,” on page 433 - Section 6.6, “Multicast (IGMP and PIM),” on page 915 Updated: - the command “port type” on page 174 - the command “show configuration” on page 230 - the command “show uboot” on page 403 - the command “show voltage” on page 412 - Section 5.3, “MLAG,” on page 537 - the command “show mlag” on page 556 - Section 6.1.5.2, “Interface VLAN,” on page 726 - Section 6.1.5.3, “Loopback Interface,” on page 735 - Section 8.2.2.4, “Proxy-ARP Load Balancing,” on page 1196
Rev 2.80	08 May, 2014	Added: - supported versions note in Section 5.8, “IGMP Snooping,” on page 621 - Section 6.7, “VRRP,” on page 961 - Section 6.8, “MAGP,” on page 976 - Section 6.9, “DHCP Relay,” on page 984
Rev 2.60	10 April, 2014	Updated: - the command “interfaces ib internal notification” on page 446 - Table 35, “Private MIBs Supported,” on page 426

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 2.50	April 2014	Updated: - Section 3.1.7, “Command Output Filtering,” on page 54 - Section 4.16.6, “System Reboot,” on page 392 - the command “show protocols” on page 418 - the command “show mac-address-table” on page 576 - the command “deny/permit (MAC ACL rule)” on page 676 - the command “show mac/ipv4 access-lists” on page 682 - the command “ha member ip address” on page 1235 Added: - Section 5.3, “MLAG,” on page 537 - configuration mode Config Interface MLAG Port Channel to the following commands: “flowcontrol” on page 504 “mtu” on page 505 “shutdown” on page 506 “description” on page 507 “speed” on page 508 “load-interval” on page 509 “clear counters” on page 510 “switchport mode” on page 567 “switchport access” on page 568 “spanning-tree port-priority” on page 588 “spanning-tree cost” on page 589 “spanning-tree port type” on page 590 “spanning-tree guard” on page 591 “ip igmp snooping fast-leave” on page 627 “dcb priority-flow-control mode on” on page 670 “ipv4/mac port access-group” on page 675 “sflow enable (interface)” on page 712
Rev 2.40	February, 2014	Updated: - Section 4.6.5.3, “Importing Firmware and Changing the Default Firmware,” on page 187 – updated Step 1 - Command “show running-config” on page 231 - Command “show log” on page 250 - Section 4.13, “Cryptographic (X.509, IPSec),” on page 340 - Section 5.2.1, “Configuring Static Link Aggregation Group (LAG),” on page 518 – removed unnecessary step - Command “lldp tlv-select” on page 648 - Command “show lldp interface” on page 651 - Chapter 8, “Gateway” on page 1190 Added: - Section 3.1.7, “Command Output Filtering,” on page 54 - FCoE and SX1700 GW license in Section 2.4, “Licenses,” on page 39 - Section 4.17.1.8, “IF-MIB and Interface Information,” on page 433 - Section 4.16.6, “System Reboot,” on page 392
Rev 2.30	January, 2014	Updated: - Section 4.18.4, “Writing Configuration Classes,” on page 453 - command “crypto certificate generation” on page 346 - command “crypto certificate name” on page 347

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 2.20	January, 2014	Added: - command “interfaces ib internal notification” on page 446 - command “show interfaces ib internal notification” on page 449 Updated: - Section 4.18.5.11, “Installed Image Capabilities,” on page 459
Rev 2.10	January, 2014	Added: - Section 4.16.2.2, “Width Reduction Power Saving,” on page 384 Updated: - Section 2.2, “Starting the Command Line (CLI),” on page 35 - Section 2.3, “Starting the Web User Interface,” on page 36 - command “system profile” on page 177 - Section 4.6.1, “Upgrading MLNX-OS Software,” on page 178 with EULA note - Section 4.6.2, “Upgrading MLNX-OS Software on Director Switches,” on page 181 with a note - Section 4.18, “Puppet Agent,” on page 452 - Section 5.7, “OpenFlow,” on page 612 - command “openflow description” on page 615 - command “show openflow” on page 620 - command “deny/permit (IPv4 ACL rule)” on page 677 - command “load-interval” on page 509 with Config Interface Port Channel - command “switchport {hybrid, trunk} allowed-vlan” on page 569 with Config Interface Port Channel - command “spanning-tree port-priority” on page 588 with Config Interface Port Channel - command “spanning-tree cost” on page 589 with Config Interface Port Channel - command “spanning-tree port type” on page 590 with Config Interface Port Channel - command “spanning-tree guard” on page 591 with Config Interface Port Channel - the command “spanning-tree bpdudfilter” on page 592 with Config Interface Port Channel - command “sflow enable (interface)” on page 712 with Config Interface Port Channel - Section 6.3, “OSPF,” on page 782 - command “router-id” on page 789 - Section 7.4.3, “Adaptive Routing,” on page 1013 Merged sections “Restoring Factory Default Configuration on a Switch System (Single Management Module)” and “Restoring Factory Default Configuration on a Switch Directors (Dual Management Modules)” under Section 4.7.3, “Restoring Factory Default Configuration,” on page 202.

Table 1 - Document Revision History

Document Revision	Date	Description
Rev 2.00	December 2013	Added Section 5.1.3, “Transceiver Information,” on page 501 Added Section 7.3.1, “Transceiver Information,” on page 999 Added the command “run-interval” on page 464 Added note to Section 8.4.3, “MTU,” on page 1207 Updated Section 4.4, “Virtual Protocol Interconnect (VPI),” on page 172 with SX1012 and SX6012 Updated Section 4.6.1, “Upgrading MLNX-OS Software,” on page 178 Updated Section 4.6.3, “Deleting Unused Images,” on page 182 Updated Section 4.9, “Debugging,” on page 251 Updated the example of the command “show cpld” on page 404 Updated “Notification Indicator” column in Section 8.3.2, “Standalone Proxy-ARP Configuration,” on page 1200 Updated the command “show puppet-agent” on page 466 Updated the command “lldp tlv-select” on page 648 Updated the command “interface proxy-arp” on page 1210 Updated the command “ip address” on page 1214 Updated the command “ip vlan” on page 1216 Updated the command “ip pkey” on page 1217 Updated the command “ip route” on page 1218 Updated the command “counters” on page 1223 Moved Section 3.3, “Secure Shell (SSH),” on page 62 from 4.13.2 Removed mention of the MLNX-OS Command Reference Guide Removed the command “lldp tlv-select dcbx”
Rev 1.90	November 2013	Added Appendix A, “MEX6200 System,” on page 1256
Rev 1.80	October 2013	Added: • Section 4.18, “Puppet Agent,” on page 452 • Section 5.6.7, “MSTP,” on page 580 • Section 5.7, “OpenFlow,” on page 612 • Section 5.8.3, “IGMP Snooping Querier,” on page 623 • the command “ip igmp snooping querier” • the command “igmp snooping querier query-interval” • the command “show ip igmp snooping querier” • Section 5.9.2, “DCBX,” on page 640 • the command “lldp tlv-select dcbx” • the command “dcb application-priority” • the command “show dcb application-priority” • Section 6.9, “DHCP Relay,” on page 984 Updated • the command “show lldp interface” • the command “show lldp interfaces ethernet <inf> remote”
Rev 1.7.0	October 2013	Merged “MLNX-OS Command Reference Guide” Rev. 1.6.9 and “MLNX-OS User Manual” Rev. 1.6.9.

About this Manual

This manual provides general information concerning the scope and organization of this User's Manual.

Intended Audience

This manual is intended for network administrators who are responsible for configuring and managing Mellanox Technologies' SwitchX based Switch Platforms.

Related Documentation

The following table lists the documents referenced in this *User's Manual*.

Table 2 - Reference Documents

Document Name	Description
InfiniBand Architecture Specification, Vol. 1, Release 1.2.1	The InfiniBand Architecture Specification that is provided by IBTA.
Director switch Installation Guide	Each Mellanox Technologies' switch platform is shipped with an Installation Guide document to bring-up and initialize the switch platform.
System Hardware User Manual	This document contains hardware descriptions, LED assignments and hardware specifications among other things.
Switch Product Release Notes	Please look up the relevant SwitchX®-based switch system/series release note file
Mellanox Virtual Modular Switch Reference Guide	This reference architecture provides general information concerning Mellanox L2 and L3 Virtual Modular Switch (VMS) configuration and design.
Configuring Mellanox Hardware for VPI Operation Application Note	This manual provides information on basic configuration of the converged VPI networks.

All of these documents can be found on the Mellanox website. They are available either through the product pages or through the support page with a login and password.

Glossary

Table 3 - Glossary

AAA	Authentication, Authorization, and Accounting. Authentication - verifies user credentials (username and password). Authorization - grants or refuses privileges to a user/client for accessing specific services. Accounting - tracks network resources consumption by users.
ARP	Address Resolution Protocol. A protocol that translates IP addresses into MAC addresses for communication over a local area network (LAN).

Table 3 - Glossary

CLI	Command Line Interface. A user interface in which you type commands at the prompt
DCB	Data Center Bridging
DCBX	DCBX protocol is an extension of the Link Layer Discovery Protocol (LLDP). DCBX end points exchange request and acknowledgment messages. For flexibility, parameters are coded in a type-length-value (TLV) format.
DHCP	The Dynamic Host Configuration Protocol (DHCP) is an automatic configuration protocol used on IP networks.
Director Class Switch	A high density InfiniBand chassis switch system
DNS	Domain Name System. A hierarchical naming system for devices in a computer network
ETS	ETS provides a common management framework for assignment of bandwidth to traffic classes.
Fabric Management	The use of a set of tools (APIs) to configure, discover, and manage and a group of devices organized as a connected fabric.
FTP/TFTP/sFTP	File Transfer Protocol (FTP) is a standard network protocol used to transfer files from one host to another over a TCP-based network, such as the Internet.
Gateway	A network node that interfaces with another network using a different network protocol
GID (Global Identifier)	A 128-bit number used to identify a Port on a network adapter (see below), a port on a Router, or a Multicast Group.
GUID (Globally Unique Identifier)	A 64-bit number that uniquely identifies a device or component in a subnet
HA (High Availability)	A system design protocol that provides redundancy of system components, thus enables overcoming single or multiple failures in minimal downtime
Host	A computer platform executing an Operating System which may control one or more network adapters
IB	InfiniBand
LACP	Link Aggregation Control Protocol (LACP) provides a method to control the bundling of several physical ports together to form a single logical channel. LACP allows a network device to negotiate an automatic bundling of links by sending LACP packets to the peer (directly connected device that also implements LACP).
LDAP	The Lightweight Directory Access Protocol is an application protocol for reading and editing directories over an IP network.
LID (Local Identifier)	A 16 bit address assigned to end nodes by the subnet manager Each LID is unique within its subnet.

Table 3 - Glossary

MAC	A Media Access Control address (MAC address) is a unique identifier assigned to network interfaces for communications on the physical network segment. MAC addresses are used for numerous network technologies and most IEEE 802 network technologies including Ethernet.
MTU (Maximum Transfer Unit)	The maximum size of a packet payload (not including headers) that can be sent /received from a port
Network Adapter	A hardware device that allows for communication between computers in a network
PFC/FC	Priority Based Flow Control applies pause functionality to traffic classes OR classes of service on the Ethernet link.
RADIUS	Remote Authentication Dial In User Service. A networking protocol that enables AAA centralized management for computers to connect and use a network service.
RDMA (Remote Direct Memory Access)	Accessing memory in a remote side without involvement of the remote CPU
RSTP	Rapid Spanning Tree Protocol. A spanning-tree protocol used to prevent loops in bridge configurations. RSTP is not aware of VLANs and blocks ports at the physical level.
SA (Subnet Administrator)	The interface for querying and manipulating subnet management data
SCP	Secure Copy or SCP is a means of securely transferring computer files between a local and a remote host or between two remote hosts. It is based on the Secure Shell (SSH) protocol.
SM (Subnet Manager)	An entity that configures and manages the subnet, discovers the network topology, assign LIDs, determines the routing schemes and sets the routing tables. There is only one master SM and possible several slaves (Standby mode) at a given time. The SM administers switch routing tables thereby establishing paths through the fabric
SNMP	Simple Network Management Protocol. A network protocol for the management of a network and the monitoring of network devices and their functions
NTP	Network Time Protocol. A protocol for synchronizing computer clocks in a network
SSH	Secure Shell. A protocol (program) for securely logging in to and running programs on remote machines across a network. The program authenticates access to the remote machine and encrypts the transferred information through the connection.
syslog	A standard for forwarding log messages in an IP network
TACACS+	Terminal Access Controller Access-Control System Plus. A networking protocol that enables access to a network of devices via one or more centralized servers. TACACS+ provides separate AAA services.
XML Gateway	Extensible Markup Language Gateway. Provides an XML request-response protocol for setting and retrieving HW management information.

1 Introduction

Mellanox® Operating System (MLNX-OS®) enables the management and configuration of Mellanox Technologies' SwitchX® Family silicon based switch platforms. MLNX-OS supports the Virtual Protocol Interconnect (VPI) technology which enables it to be used for both Ethernet and InfiniBand technology providing the user with greater flexibility.

MLNX-OS provides a full suite of management options, including support for Mellanox's Unified Fabric Manager® (UFM), SNMPv1, 2, 3, and web user interface (WebUI). In addition, it incorporates a familiar industry-standard CLI, which enables administrators to easily configure and manage the system.

1.1 System Features

Table 4 - General System Features

Feature	Description
Software Management	- Dual software image - Software and firmware updates
File management	- FTP - TFTP - SCP
Logging	- Event history log - SysLog support
Management Interface	- DHCP/Zeroconf - IPv6
Chassis Management	- Monitoring environmental controlsPower management - Auto-temperature control - High availability
Network Management Interfaces	- SNMP v1,v2c,v3 - interfaces (XML Gateway) - Puppet Agent
Security	- SSH - Telnet - RADIUS - TACACS+
Date and Time	NTP
Cables & Transceivers	Transceiver info
Unbreakable links	LLR
Virtual Port Interconnect® (VPI)	- Ethernet - InfiniBand

1.2 Ethernet Features

Table 5 - Ethernet Features

Feature	Description
General	• ACL – 24K rules (permit/deny) • Breakout cables • Jumbo Frames (9K)
Ethernet support	• 48K Unicast MAC addresses • DCBX • DHCP Relay • ETS (802.1Qaz) • Flow control (802.3x) • IGMP snooping v1,2 • LAG/LACP (802.3ad), 16 links per LAG (64 LAGs) • LLDP • MLAG • MSTP • OpenFlow • PFC (802.1Qbb) • Rapid Spanning Tree (802.1w) • sFlow • VLAN (802.1Q) - 4K
IP routing	• BGP • DHCP Relay • ECMP • IGMP • IPv4 • IPv6 • OSPF • PIM • VLAN interface • Loopback interface • Router interface • VRRP

1.3 InfiniBand Features

Table 6 - InfiniBand Features

Feature	Description
Subnet Manager	• OpenSM • Partitions • High Availability Subnet Manager
Fabric diagnostics	• Fabric inspector
Gateway	• Proxy ARP • High Availability Proxy-ARP

1.4 Gateway Features

Table 7 - Gateway Features

Feature	Description
Proxy-ARP	- Proxy-ARP interface - Unicast - Multicast - High availability Proxy-ARP

Figure 1: Managing an Ethernet Fabric Using MLNX-OS

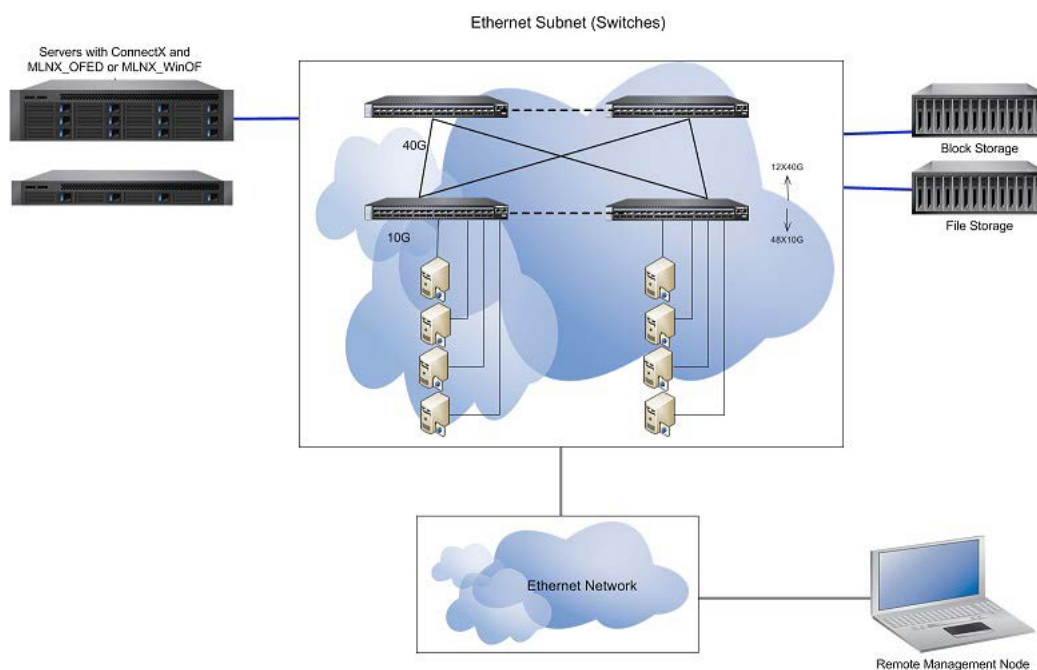


Figure 2: Managing an InfiniBand Software Using MLNX-OS

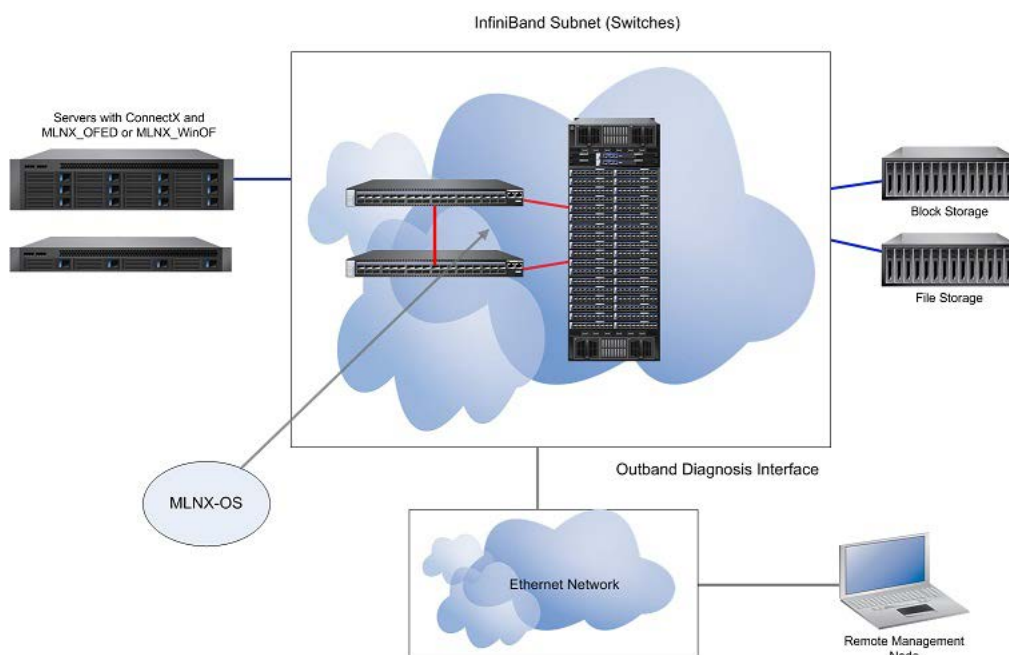
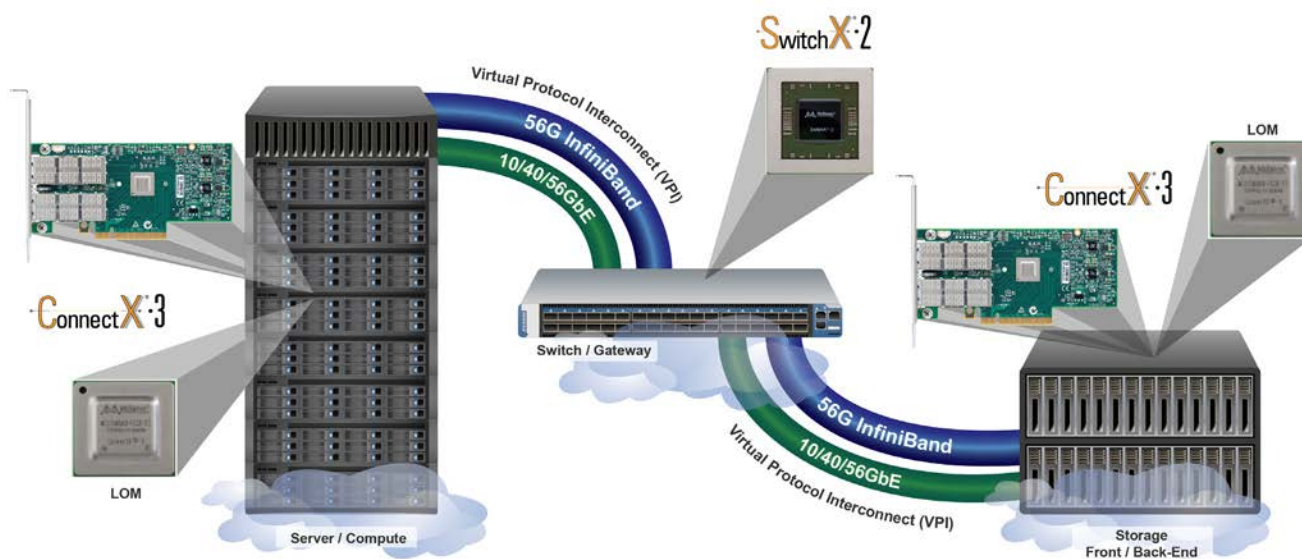


Figure 3: Managing a Gateway Software Using MLNX-OS



2 Getting Started

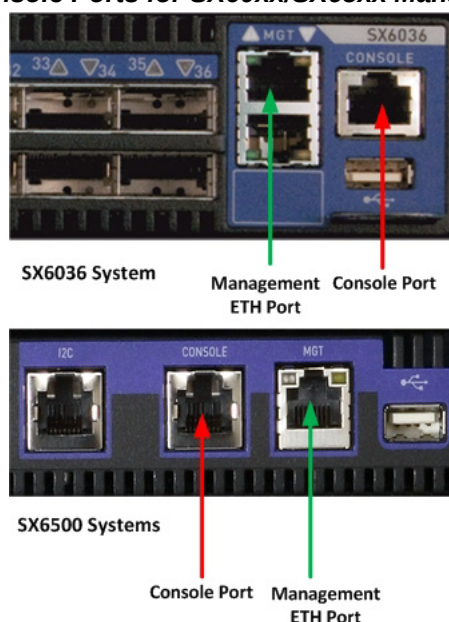
The procedures described in this chapter assume that you have already installed and powered on your switch according to the instructions in the *Hardware Installation Guide*, which was shipped with the product.

2.1 Configuring the Switch for the First Time

➤ **To configure the switch:**

- Step 1.** Connect the host PC to the console (RJ-45) port of the switch system using the supplied cable. The console ports for systems are shown below as examples.

Figure 4: Console Ports for SX60xx/SX65xx Managed Systems



On SX65xx systems, when having dual management systems, first connect the cable and configure the master card and only then configure the slave. By default the master card is the top management module. Initial configuration must be performed on all of the management modules.



Make sure to connect to the console RJ-45 port of the switch and not to the MGT port.



DHCP is enabled by default over the MGT port. Therefore, if you have configured your DHCP server and connected an RJ-45 cable to the MGT port, simply log in using the designated IP address.

Step 2. Configure a serial terminal with the settings described below.



This step may be skipped if the DHCP option is used and an IP is already configured for the MGT port.

Table 8 - Serial Terminal Program Configuration for PPC Based Systems

Parameter	Setting
Baud Rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

Table 9 - Serial Terminal Program Configuration for x86 Based Systems

Parameter	Setting
Baud Rate	115200
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

Step 3. Login as *admin* and use *admin* as password.

Step 4. Go through the Mellanox configuration wizard.

The following table shows an example of a wizard session.

Table 10 - Configuration Wizard Session - IP Configuration by DHCP (Sheet 1 of 3)

Wizard Session Display (Example)	Comments
Mellanox configuration wizard Do you want to use the wizard for initial configuration? yes	You must perform this configuration the first time you operate the switch or after resetting the switch to the factory defaults. Type “y” and then press <Enter>.
Step1: Hostname? [switch-1]	If you wish to accept the default hostname, then press <Enter>. Otherwise, type a different hostname and press <Enter>.

Table 10 - Configuration Wizard Session - IP Configuration by DHCP (Sheet 2 of 3)

Wizard Session Display (Example)	Comments
Step 2: Use DHCP on mgmt0 interface? [yes]	Perform this step to obtain an IP address for the switch. (mgmt0 is the management port of the switch.) If you wish the DHCP server to assign the IP address, type “yes” and press <Enter>. If you type “no” (no DHCP), then you will be asked whether you wish to use the “zeroconf” configuration or not. If you enter “yes” (yes Zeroconf), the session will continue as shown in Table 11. If you enter “no” (no Zeroconf), then you need to enter a <i>static</i> IP, and the session will continue as shown in Table 12.
Step 3: Enable IPv6 [yes]	Perform this step to enable IPv6 on management ports. If you wish to enable IPv6, type “yes” and press <Enter>. If you enter “no” (no IPv6), then you will automatically be referred to Step 5.
Step 4: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface	Perform this step to enable StateLess address autoconfig on external management port. If you wish to enable it, type “yes” and press <Enter>. If you wish to disable it, enter “no”.
Step 5: Admin password (Press <Enter> to leave unchanged)? <new_password> Step 4: Confirm admin password? <new_password>	To avoid illegal access to the machine, please type a password and then press <Enter>. Then confirm the password by re-entering it. Note that password characters are <i>not</i> printed.

Table 10 - Configuration Wizard Session - IP Configuration by DHCP (Sheet 3 of 3)

Wizard Session Display (Example)	Comments
You have entered the following information: 1. Hostname: <switch name> 2. Use DHCP on mgmt0 interface: yes 3. Enable IPv6: yes 4. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: yes 5. Admin password (Enter to leave unchanged): (CHANGED) To change an answer, enter the step number to return to. Otherwise hit <enter> to save changes and exit. Choice: <Enter> Configuration changes saved. To return to the wizard from the CLI, enter the “configuration jump-start” command from configuration mode. Launching CLI... <switch name> [standalone: master] >	The wizard displays a summary of your choices and then asks you to confirm the choices or to re-edit them. Either press <Enter> to save changes and exit, or enter the configuration step number that you wish to return to. Note: To run the command “configuration jump-start” you must be in Config mode.

Table 11 - Configuration Wizard Session - IP Zeroconf Configuration

Wizard Session Display - IP Zeroconf Configuration (Example)
Mellanox configuration wizard Do you want to use the wizard for initial configuration? y Step 1: Hostname? [switch-112126] Step 2: Use DHCP on mgmt0 interface? [no] Step 3: Use zeroconf on mgmt0 interface? [no] yes Step 4: Default gateway? [192.168.10.1] Step 5: Primary DNS server? Step 6: Domain name? Step 7: Enable IPv6? [yes] yes Step 8: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface? [no] no Step 9: Admin password (Enter to leave unchanged)? You have entered the following information: 1. Hostname: switch-112126 2. Use DHCP on mgmt0 interface: no 3. Use zeroconf on mgmt0 interface: yes 4. Default gateway: 192.168.10.1 5. Primary DNS server: 6. Domain name: 7. Enable IPv6: yes 8. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: yes 9. Admin password (Enter to leave unchanged): (unchanged) To change an answer, enter the step number to return to. Otherwise hit <enter> to save changes and exit. Choice: Configuration changes saved. To return to the wizard from the CLI, enter the “configuration jump-start” command from configure mode. Launching CLI... <switch name> [standalone: master] >

Table 12 - Configuration Wizard Session - Static IP Configuration

Wizard Session Display - Static IP Configuration (Example)
Mellanox configuration wizard Do you want to use the wizard for initial configuration? y Step 1: Hostname? [switch-112126] Step 2: Use DHCP on mgmt0 interface? [yes] n Step 3: Use zeroconf on mgmt0 interface? [no] Step 4: Primary IP address? 192.168.10.4 Mask length may not be zero if address is not zero (interface mgmt0) Step 5: Netmask? [0.0.0.0] 255.255.255.0 Step 6: Default gateway? 192.168.10.1 Step 7: Primary DNS server? Step 8: Domain name? Step 9: Enable IPv6? [yes] yes Step 10: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface? [no] no Step 11: Admin password (Enter to leave unchanged)? You have entered the following information: 1. Hostname: switch-112126 2. Use DHCP on mgmt0 interface: no 3. Use zeroconf on mgmt0 interface: no 4. Primary IP address: 192.168.10.4 5. Netmask: 255.255.255.0 6. Default gateway: 192.168.10.1 7. Primary DNS server: 8. Domain name: 9. Enable IPv6: yes 10. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: no 11. Admin password (Enter to leave unchanged): (unchanged) To change an answer, enter the step number to return to. Otherwise hit <enter> to save changes and exit. Choice: Configuration changes saved. To return to the wizard from the CLI, enter the “configuration jump-start” command from configure mode. Launching CLI... <switch name>[standalone: master] >

- Step 5.** Check the mgmt0 interface configuration before attempting a remote (for example, SSH) connection to the switch. Specifically, verify the existence of an IP address.

```
switch # show interfaces mgmt0
Interface mgmt0 state
Admin up:          yes
Link up:           yes
IP address:        169.254.15.134
Netmask:           255.255.0.0
IPv6 enabled:      yes
Autoconf enabled:  yes
Autoconf route:    yes
Autoconf privacy:  no
IPv6 addresses:    1
IPv6 address:      fe80::202:c9ff:fe11:a1b2/64
Speed:             1000Mb/s (auto)
Duplex:            full (auto)
Interface type:    ethernet
Interface source:  physical
MTU:               1500
HW address:        00:02:C9:11:A1:B2
Comment:
RX bytes:          11700449      TX bytes:          15139846
RX packets:        55753        TX packets:        28452
RX mcast packets:  0           TX discards:       0
RX discards:       0           TX errors:          0
RX errors:         0           TX overruns:        0
RX overruns:       0           TX carrier:         0
RX frame:          0           TX collisions:      0
TX queue len:      1000
```

2.1.1 Re-Running the Wizard

➤ *To rerun the wizard:*

- Step 1.** Enter the config mode.

```
switch > enable
switch # config terminal
```

- Step 2.** Rerun the wizard.

```
switch (config) # configuration jump-start
```

2.2 Starting the Command Line (CLI)

- Step 1.** Set up an Ethernet connection between the switch and a local network machine using a standard RJ-45 connector.
- Step 2.** Start a remote secured shell (SSH) to the switch using the command “ssh -l <username> <switch ip address>.”
- ```
rem_mach1 > ssh -l <username> <ip address>
```
- Step 3.** Login to the switch (default username is *admin*, password *admin*)
- Step 4.** Read and accept the EULA when prompted.

- Step 5.** Once you get the prompt, you are ready to use the system.

```
Mellanox MLNX-OS Switch Management

Password:
Last login: <time> from <ip-address>

Mellanox Switch
Please read and accept the Mellanox End User License Agreement located at:
http://www.mellanox.com/related-docs/prod_management_software/MLNX-OS_EULA.pdf

switch >
```

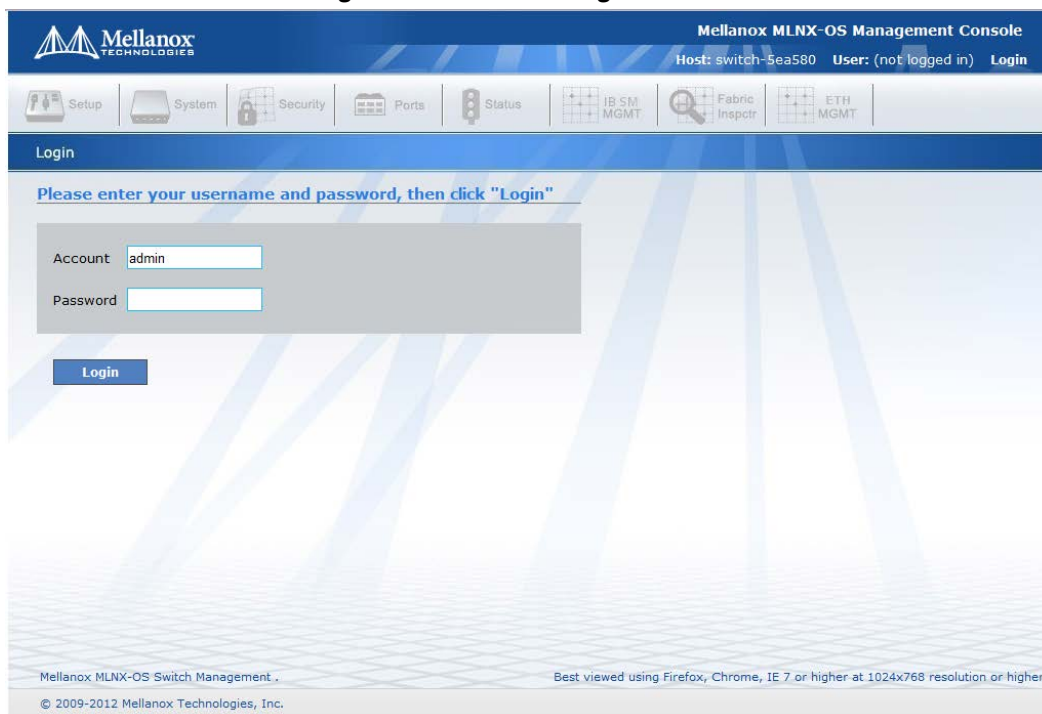
## 2.3 Starting the Web User Interface

- *To start a WebUI connection to the switch platform:*



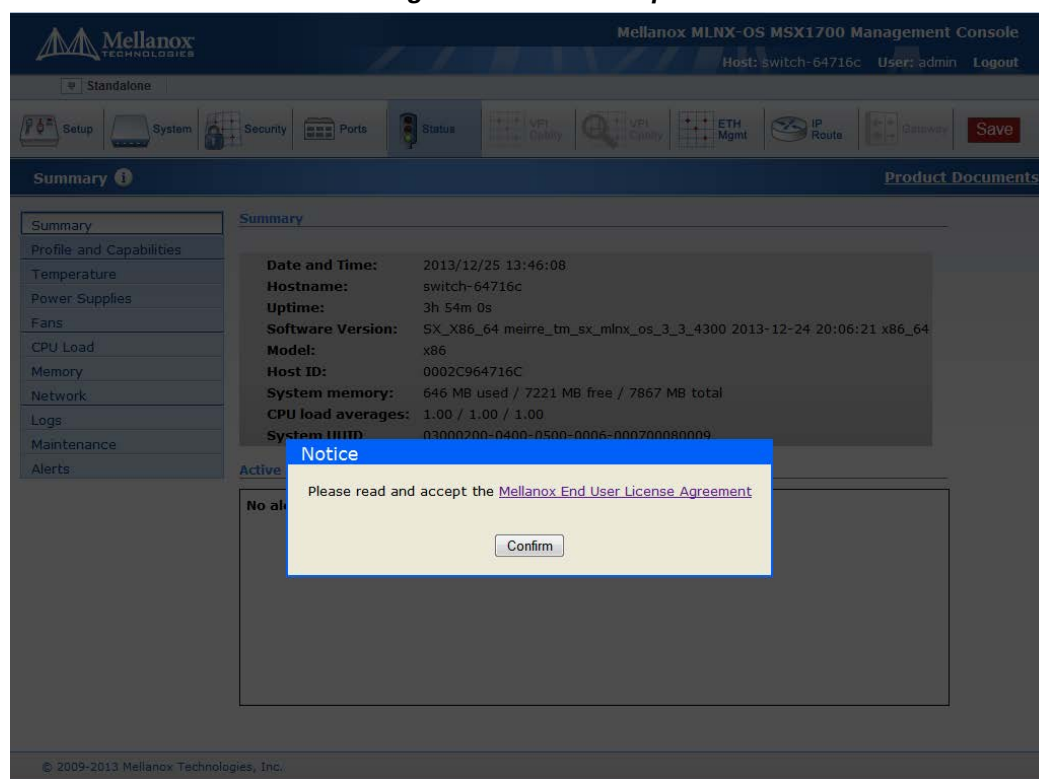
WebUI access is disabled by default  
To enable web access, run the command “web http enable” or “web https enable” through the CLI.

- Step 1.** Set up an Ethernet connection between the switch and a local network machine using a standard RJ-45 connector.
- Step 2.** Open a web browser – Firefox 12, Chrome 18, IE 8, Safari 5 or higher.  
**Note:** Make sure the screen resolution is set to 1024\*768 or higher.
- Step 3.** Type in the IP address of the switch or its DNS name in the format: http://<switch\_IP\_address>.
- Step 4.** Login to the switch (default user name is *admin*, password *admin*).

**Figure 5: MLNX-OS Login Window**


The image shows the Mellanox MLNX-OS Management Console login window. At the top, the Mellanox logo is on the left, and the title 'Mellanox MLNX-OS Management Console' is on the right. Below the title, it says 'Host: switch-5ea580' and 'User: (not logged in)' with a 'Login' button. A navigation bar contains icons for Setup, System, Security, Ports, Status, JB SM MGMT, Fabric Inspector, and ETH MGMT. The main area is titled 'Login' and contains the instruction 'Please enter your username and password, then click "Login"'. Below this are two input fields: 'Account' with the value 'admin' and 'Password' which is empty. A 'Login' button is at the bottom left. At the bottom of the page, it says 'Mellanox MLNX-OS Switch Management' and 'Best viewed using Firefox, Chrome, IE 7 or higher at 1024x768 resolution or higher.' and '© 2009-2012 Mellanox Technologies, Inc.'

- Step 5.** Read and accept the EULA if prompted.  
You are only prompted if you have not accessed the switch via CLI before.

**Figure 6: EULA Prompt**


The image shows the Mellanox MLNX-OS Management Console summary page. At the top, the Mellanox logo is on the left, and the title 'Mellanox MLNX-OS MSX1700 Management Console' is on the right. Below the title, it says 'Host: switch-64716c' and 'User: admin' with a 'Logout' button. A navigation bar contains icons for Setup, System, Security, Ports, Status, vPI, vPI, ETH Mgmt, IP Route, and Gateway. A 'Save' button is on the right. The main area is titled 'Summary' and contains a table of system information. A 'Notice' dialog box is overlaid on the page, asking the user to read and accept the Mellanox End User License Agreement. The dialog box has a 'Confirm' button. At the bottom of the page, it says '© 2009-2013 Mellanox Technologies, Inc.'

| Summary            |                                                                    |
|--------------------|--------------------------------------------------------------------|
| Date and Time:     | 2013/12/25 13:46:08                                                |
| Hostname:          | switch-64716c                                                      |
| Uptime:            | 3h 54m 0s                                                          |
| Software Version:  | SX_X86_64 meirre_tm_sx_mlnx_os_3_3_4300 2013-12-24 20:06:21 x86_64 |
| Model:             | x86                                                                |
| Host ID:           | 0002C964716C                                                       |
| System memory:     | 646 MB used / 7221 MB free / 7867 MB total                         |
| CPU load averages: | 1.00 / 1.00 / 1.00                                                 |
| System UUID:       | 03000200-0400-0500-0006-000700080009                               |

- Step 6.** The Welcome popup appears. After reading through the content, click OK to continue. You may click on the links under Documentation to reach the MLNX-OS documentation. The link under What's New takes you straight to the RN Changes and New Features section.

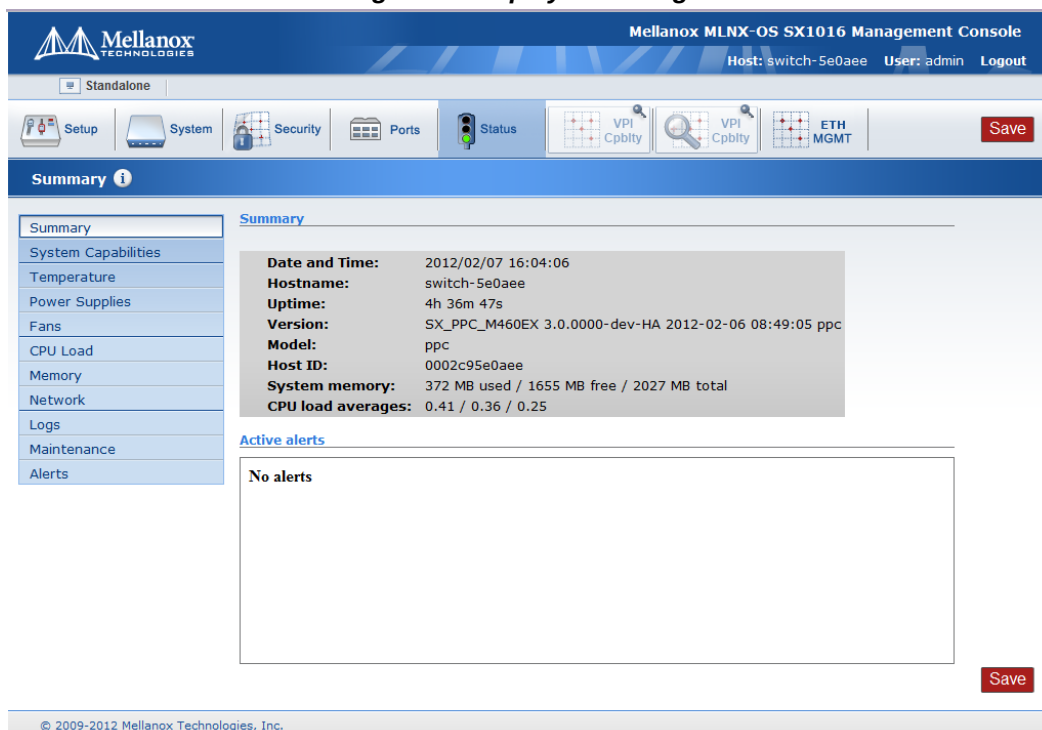
**Figure 7: Welcome Popup**



You may also tick the box to not show this popup again. But should you wish to see this window again, click “Product Documents” on the upper right corner of the WebUI.

- Step 7.** A default status summary is displayed as shown in Figure 8.

**Figure 8: Display After Login**



## 2.4 Licenses



Gateway is not supported in MLNX-OS release 3.4.1110.

MLNX-OS software package can be extended with premium features. Installing a license allows you to access the specified premium features.



This section is relevant only to switch systems with an internal management capability.

The following licenses are offered with MLNX-OS software:

**Table 13 - MLNX-OS Licenses**

| OPN                  | Valid on Product                                                 | Description                                       |
|----------------------|------------------------------------------------------------------|---------------------------------------------------|
| UPGR-6012-GW         | SX6012                                                           | Ethernet L2/L3, Gateway                           |
| UPGR-6012F-56GE      | SX6012                                                           | 56GbE link speed                                  |
| UPGR-1012-GW         | SX1012                                                           | InfiniBand, Ethernet L3, Gateway                  |
| UPGR-1012-56GE       | SX1012                                                           | 56GbE link speed                                  |
| UPGR-6018-GW         | SX6018                                                           | Ethernet L2/L3, Gateway                           |
| UPGR-6018F-56GE      | SX6018                                                           | 56GbE link speed                                  |
| UPGR-6036-GW         | SX6036                                                           | Ethernet L2/L3, Gateway                           |
| UPGR-6036F-56GE      | SX6036                                                           | 56GbE link speed                                  |
| UPGR-1036-GW         | SX1036                                                           | InfiniBand, Ethernet L3, Gateway                  |
| UPGR-1036-56GE       | SX1036                                                           | 56GbE link speed                                  |
| UPGR-1024-56GE       | SX1024                                                           | 56GbE link speed                                  |
| UPGR-1710-GW         | SX1710                                                           | InfiniBand, Ethernet L3, Gateway                  |
| UPGR-6710-GW         | SX6710                                                           | InfiniBand, Ethernet L3, Gateway                  |
| LIC-fabric-inspector | SX6036F/T; 6012F/T;<br>6018F/T; SX65xx                           | InfiniBand fabric inspector monitoring and health |
| UPGR-xxxx-FCOE-J     | All systems support-<br>ing Ethernet directly<br>or via license. | Enables FCoE protocol                             |

### 2.4.1 Installing MLNX-OS® License (CLI)

➤ *To install an MLNX-OS license via CLI:*

**Step 1.** Login as *admin* and change to *Config* mode.

```
switch > enable
switch # config terminal
```

**Step 2.** Install the license using the key. Run:

```
switch (config) # license install <license key>
```

**Step 3.** Display the installed license(s) using the following command.

```
switch (config) # show licenses
License 1: <license key>
Feature: EFM_SX
Valid: yes
Active: yes
switch (config) #
```

Make sure that the “Valid” and “Active” fields both indicate “yes”.

**Step 4.** Save the configuration to complete the license installation. Run:

```
switch (config) # configuration write
```



If you do not save the installation session, you will lose the license at the next system start up.

## 2.4.2 Installing MLNX-OS License (Web)

➤ *To install an MLNX-OS license via WebUI:*

**Step 1.** Log in as *admin*.

**Step 2.** Click the **Setup** tab and then **Licensing** on the left side navigation pane.



Figure 9: No Licenses Installed

**Mellanox MLNX-OS SX6506 Management Console**  
 Host: switch-113dc8 User: admin Logout  
 Standalone Virtual IP Active node Chassis master Subnet Manager is not running.

Setup System Security Ports Status IB SM MGMT Fabric Inspectr ETH MGMT Save

**Licensing**

Interfaces  
 HA  
 Routing  
 DNS  
 Hostname  
 Hosts  
**ARP**  
 Neighbors  
 Virtual Switch Mgmt  
 Web  
 SNMP  
 Email Alerts  
 XML gateway  
 Logs  
 Configurations  
 Date and Time  
 NTP  
 Licensing

System Serial Number  
 MXXXXXXXXXX7

Installed Licenses

| License | Key                      | Feature                                 | Valid  | Max num ufm ports supported | Active |     |
|---------|--------------------------|-----------------------------------------|--------|-----------------------------|--------|-----|
|         | <input type="checkbox"/> | LK2-EFM_SX-5P26-85G2-3488-A3MG-VD3V-E7U | EFM_SX | yes                         | 200    | yes |

Remove

Add New License(s)

Please enter one or more licenses, each on a separate line.

Add Licenses Save

© 2009-2012 Mellanox Technologies, Inc.

- Step 3.** Enter your license key(s) in the text box. If you have more than one license, please enter each license in a separate line. Click “Add Licenses” after entering the last license key to install them.



If you wish to add another license key in the future, you can simply enter it in the text box and click “Add Licenses” to install it.

Figure 10: Enter License Key(s) in Text Box

**Mellanox MLNX-OS SX6506 Management Console**  
 Host: switch-113dc8 User: admin Logout  
 Standalone Virtual IP Active node Chassis master Subnet Manager is not running.

**Licensing**

System Serial Number  
 MXXXXXXXXXX7

Installed Licenses

| License                  | Key                                     | Feature | Valid | Max num ufm ports supported | Active |
|--------------------------|-----------------------------------------|---------|-------|-----------------------------|--------|
| <input type="checkbox"/> | LK2-EFM_SX-5P26-85G2-3488-A3MG-VD3V-E7U | EFM_SX  | yes   | 200                         | yes    |

[Remove](#)

[Add New License\(s\)](#)

Please enter one or more licenses, each on a separate line.

<your license key>

[Add Licenses](#) [Save](#)

© 2009-2012 Mellanox Technologies, Inc.

All installed licenses should now be displayed.

Figure 11: Installed License

**Mellanox MLNX-OS SX6506 Management Console**  
 Host: switch-113dc8 User: admin Logout  
 Standalone Virtual IP Active node Chassis master Subnet Manager is not running.

**Licensing**

System Serial Number  
 MXXXXXXXXXX7

Installed Licenses

| License                  | Key                | Feature | Valid | Max num ufm ports supported | Active |
|--------------------------|--------------------|---------|-------|-----------------------------|--------|
| <input type="checkbox"/> | LK2-XXXXXXXXXX-E7U | EFM_SX  | yes   | 200                         | yes    |

[Remove](#)

[Add New License\(s\)](#)

Please enter one or more licenses, each on a separate line.

[Add Licenses](#) [Save](#)

© 2009-2012 Mellanox Technologies, Inc.

**Step 4.** Save the configuration to complete the license installation.



If you do not save the installation session, you will lose the installed licenses at the next system boot.

### 2.4.3 Retrieving a Lost License Key

In case of a lost MLNX-OS® license key, contact your authorized Mellanox reseller and provide the switch's *chassis serial number*.

➤ **To obtain the switch's chassis serial number:**

**Step 1.** Login to the switch.

**Step 2.** Retrieve the switch's *chassis serial number* using the command “show inventory”.

```
switch (config) # show inventory
```

| Module  | Type       | Part number   | Serial Number |
|---------|------------|---------------|---------------|
| CHASSIS | SX1035     | MSX6036F-1BFR | MT1121X02692  |
| MGMT    | SX1035     | MSX6036F-1BFR | MT1121X02692  |
| FAN     | SXX0XX_FAN | MSX60-FF      | MT1121X02722  |
| PS1     | SXX0XX_PS  | N/A           | N/A           |
| CPU     | CPU        | SA000103      | MT1120X01027  |

```
switch (config) #
```

**Step 3.** Send your Mellanox reseller the following information to obtain the license key:

- The chassis serial number
- The type of license you need to retrieve. Refer to [“Licenses” on page 39](#).

**Step 4.** Once you receive the license key, you can install the license as described in the sections above.

## 2.4.4 Commands

### file eula upload

**file eula upload <filename> <URL>**

Uploads the Mellanox End User License Agreement to a specified remote location.

|                           |                                                                                                                                                                         |                                                          |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                                                                | The Mellanox End User License Agreement                  |
|                           | URL                                                                                                                                                                     | URL or scp://username[:password]@hostname/path/ filename |
| <b>Default</b>            | N/A                                                                                                                                                                     |                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                  |                                                          |
| <b>History</b>            | 3.4.1100                                                                                                                                                                |                                                          |
| <b>Role</b>               | monitor/admin                                                                                                                                                           |                                                          |
| <b>Example</b>            | <pre>switch (config) # file help-docs upload Mellanox_End_User_ License_Agreement.pdf &lt;scp://username[:password]@hostname/path/ filename&gt; switch (config) #</pre> |                                                          |
| <b>Related Commands</b>   | license                                                                                                                                                                 |                                                          |
| <b>Note</b>               |                                                                                                                                                                         |                                                          |

## file help-docs upload

**file help-docs upload <filename> <URL or scp://username[:password]@hostname/path/filename>**

Uploads the MLNX-OS UM or RN to a specified remote location.

|                           |                                                                                                                                                           |                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                                                  | The file to upload to a remote host                     |
|                           | URL                                                                                                                                                       | URL or scp://username[:password]@hostname/path/filename |
| <b>Default</b>            | N/A                                                                                                                                                       |                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                    |                                                         |
| <b>History</b>            | 3.4.1100                                                                                                                                                  |                                                         |
| <b>Role</b>               | admin                                                                                                                                                     |                                                         |
| <b>Example</b>            | <pre>switch (config) # file help-docs upload MLNX-OS_VPI_User_Manual.pdf &lt;scp://username[:password]@hostname/path/filename&gt; switch (config) #</pre> |                                                         |
| <b>Related Commands</b>   |                                                                                                                                                           |                                                         |
| <b>Note</b>               |                                                                                                                                                           |                                                         |

## license delete

**license delete <license-key>**

Removes license keys by ID.

|                           |                                                                     |
|---------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                 |
| <b>Default</b>            | N/A                                                                 |
| <b>Configuration Mode</b> | Config                                                              |
| <b>History</b>            | 3.4.1100                                                            |
| <b>Role</b>               | admin                                                               |
| <b>Example</b>            | switch (config) # license delete <license-key><br>switch (config) # |
| <b>Related Commands</b>   |                                                                     |
| <b>Note</b>               |                                                                     |

## license install

**licenses install <license-key>**

Installs a new license key.

|                           |                                                                       |
|---------------------------|-----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                   |
| <b>Default</b>            | N/A                                                                   |
| <b>Configuration Mode</b> | Config                                                                |
| <b>History</b>            | 3.4.1100                                                              |
| <b>Role</b>               | admin                                                                 |
| <b>Example</b>            | switch (config) # licenses install <license-key><br>switch (config) # |
| <b>Related Commands</b>   |                                                                       |
| <b>Note</b>               |                                                                       |

## show licenses

### show licenses

Displays a list of all installed licenses. For each license, the following is displayed:

- a unique ID which is a small integer
- the text of the license key as it was added
- whether or not it is valid and active
- which feature(s) it is activating
- a list of all licensable features specifying whether or not it is currently activated by a license

|                           |                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                |
| <b>History</b>            | 3.4.1100                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show licenses License 1: &lt;license key&gt; Feature: SX_CONFIG Valid: yes Active: yes switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                       |



## 3 User Interfaces

### 3.1 Command Line Interface (CLI) Overview

MLNX-OS® is equipped with an industry-standard CLI. The CLI is accessed through SSH or Telnet sessions, or directly via the console port on the front panel (if it exists).

#### 3.1.1 CLI Modes

The CLI can be in one of following modes, and each mode makes available a certain group (or level) of commands for execution. The different CLI configuration modes are:

**Table 14 - CLI Modes and Config Context**

| Configuration Mode            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard                      | When the CLI is launched, it begins in Standard mode. This is the most restrictive mode and only has commands to query a restricted set of state information. Users cannot take any actions that directly affect the system, nor can they change any configuration.                                                                                                                                                                                                                                                                   |
| Enable                        | The <code>enable</code> command moves the user to Enable mode. This mode offers commands to view all state information and take actions like rebooting the system, but it does not allow any configurations to be changed. Its commands are a superset of those in Standard mode.                                                                                                                                                                                                                                                     |
| Config                        | The <code>configure terminal</code> command moves the user from Enable mode to Config mode. Config mode is allowed only for user accounts in the “admin” role (or capabilities). This mode has a full unrestricted set of commands to view anything, take any action, and change any configuration. Its commands are a superset of those in Enable mode. To return to Enable mode, enter <code>exit</code> or <code>no configure</code> .<br><br>Note that moving directly from/to Standard mode to/from Config mode is not possible. |
| Config Interface Management   | Configuration mode for management interface <code>mgmt0</code> , <code>mgmt1</code> and loopback.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Config Interface Ethernet     | Configuration mode for Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Config Interface Port Channel | Configuration mode for Port channel (LAG).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Config VLAN                   | Configuration mode for VLAN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Any Command Mode              | Several commands such as “show” can be applied within any context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

### 3.1.2 Syntax Conventions

To help you identify the parts of a CLI command, this section explains conventions of presenting the syntax of commands.

**Table 15 - Syntax Conventions**

| Syntax Convention   | Description                                                                                                                                                                              | Example                                               |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| < > Angled brackets | Indicate a value/variable that must be replaced.                                                                                                                                         | <1...65535> or <switch inter-face>                    |
| [ ] Square brackets | Enclose optional parameters. However, only one parameter out of the list of parameters listed can be used. The user cannot have a combination of the parameters unless stated otherwise. | [destination-ip   destination-port   destination-mac] |
| { } Braces          | Enclose alternatives or variables that are required for the parameter in square brackets.                                                                                                | [mode {active   on   passive}]                        |
| Vertical bars       | Identify mutually exclusive choices.                                                                                                                                                     | active   on   passive                                 |



Do not type the angled or square brackets, vertical bar, or braces in command lines. This guide uses these symbols only to show the types of entries.



CLI commands and options are in lowercase and are case-sensitive. For example, when you enter the **enable** command, enter it all in lowercase. It cannot be **ENABLE** or **Enable**. Text entries you create are also case-sensitive.

### 3.1.3 Getting Help

You may request context-sensitive help at any time by pressing “?” on the command line. This will show a list of choices for the word you are on, or a list of top-level commands if you have not typed anything yet.

For example, if you are in Standard mode and you type “?” at the command line, then you will get the following list of available commands.

```
switch > ?
cli Configure CLI shell options
enable Enter enable mode
exit Log out of the CLI
help View description of the interactive help system
no Negate or clear certain configuration options
show Display system configuration or statistics
```

```

slogin Log into another system securely using ssh
switch Configure switch on system
telnet Log into another system using telnet
terminal Set terminal parameters
traceroute Trace the route packets take to a destination
switch-11a596 [standalone: master] >

```

If you type a legal string and then press “?” *without* a space character before it, then you will either get a description of the command that you have typed so far or the possible command/parameter completions. If you press “?” *after* a space character and “<cr>” is shown, this means that what you have entered so far is a complete command, and that you may press Enter (carriage return) to execute it.

Try the following to get started:

```

?
show ?
show c?
show clock?
show clock ?
show interfaces ? (from enable mode)

```

You can also enter “help” to view a description of the interactive help system.

Note also that the CLI supports command and/or parameter tab-completions and their shortened forms. For example, you can enter “en” instead of the “enable” command, or “cli cl” instead of “cli clear-history”. In case of ambiguity (more than one completion option is available, that is), then you can hit double tabs to obtain the disambiguation options. Thus, if you are in Enable mode and wish to learn which commands start with the letter “c”, type “c” and click twice on the tab key to get the following:

```

switch # c<tab>
clear cli configure
switch # c

```

(There are three commands that start with the letter “c”: cclear, cli and configure.)

### 3.1.4 Prompt and Response Conventions

The prompt always begins with the hostname of the system. What follows depends on what command mode the user is in. To demonstrate by example, assuming the machine name is “switch”, the prompts for each of the modes are:

```

switch > (Standard mode)
switch # (Enable mode)
switch (config) # (Config mode)

```

The following session shows how to move between command modes: \

```

switch > (You start in Standard mode)
switch > enable (Move to Enable mode)
switch # (You are in Enable mode)
switch # configure terminal (Move to Config mode)
switch (config) # (You are in Config mode)
switch (config) # exit (Exit Config mode)
switch # (You are back in Enable mode)
switch # disable (Exit Enable mode)
switch > (You are back in Standard mode)

```

Commands entered do not print any response and simply show the command prompt after you press <Enter>.

If an error is encountered in executing a command, the response will begin with “%”, followed by some text describing the error.

### 3.1.5 Using the “no” Form

Several Config mode commands offer the negation form using the keyword “no”. This no form can be used to disable a function, to cancel certain command parameters or options, or to reset a parameter value to its default. To re-enable a function or to set cancelled command parameters or options, enter the command without the “no” keyword (with parameter values if necessary).

The following example performs the following:

1. Displays the current CLI session options.
2. Disables auto-logout.
3. Displays the new CLI session options (auto-logout is disabled).
4. Re-enables auto-logout (after 15 minutes).
5. Displays the final CLI session options (auto-logout is enabled)

```
// 1. Display the current CLI session options
switch (config) # show cli
CLI current session settings:
 Maximum line size: 8192
 Terminal width: 157 columns
 Terminal length: 60 rows
 Terminal type: xterm
 Auto-logout: 15 minutes
 Paging: enabled
 Progress tracking: enabled
 Prefix modes: enabled
 ...
// 2. Disable auto-logout
switch (config) # no cli session auto-logout
// 3. Display the new CLI session options
switch-1 [standalone: master] (config) # show cli
CLI current session settings:
 Maximum line size: 8192
 Terminal width: 157 columns
 Terminal length: 60 rows
 Terminal type: xterm
 Auto-logout: disabled
 Paging: enabled
 Progress tracking: enabled
 Prefix modes: enabled
 ...
// 4. Re-enable auto-logout after 15 minutes
switch (config) # cli session auto-logout 15
```

```
// 5. Display the final CLI session options
switch (config) # show cli
CLI current session settings:
 Maximum line size: 8192
 Terminal width: 157 columns
 Terminal length: 60 rows
 Terminal type: xterm
 Auto-logout: 15 minutes
 Paging: enabled
 Progress tracking: enabled
 Prefix modes: enabled
 ...
```

### 3.1.6 Parameter Key

This section provides a key to the meaning and format of all of the angle-bracketed parameters in all the commands that are listed in this document.

**Table 16 - Angled Brackets Parameter Description**

| Parameter            | Description                                                                                                                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <domain>             | A domain name, e.g. “mellanox.com”.                                                                                                                                                                   |
| <hostname>           | A hostname, e.g. “switch-1”.                                                                                                                                                                          |
| <ifname>             | An interface name, e.g. “mgmt0”, “mgmt1”, “lo” (loopback), etc.                                                                                                                                       |
| <index>              | A number to be associated with aliased (secondary) IP addresses.                                                                                                                                      |
| <IP address>         | An IPv4 address, e.g. “192.168.0.1”.                                                                                                                                                                  |
| <log level>          | A syslog logging severity level. Possible values, from least to most severe, are: “debug”, “info”, “notice”, “warning”, “error”, “crit”, “alert”, “emerg”.                                            |
| <GUID>               | Globally Unique Identifier. A number that uniquely identifies a device or component.                                                                                                                  |
| <MAC address>        | A MAC address. The segments may be 8 bits or 16 bits at a time, and may be delimited by “:” or “.”. So you could say “11:22:33:44:55:66”, “1122:3344:5566”, “11.22.33.44.55.66”, or “1122.3344.5566”. |
| <netmask>            | A netmask (e.g. “255.255.255.0”) or mask length prefixed with a slash (e.g. “/24”). These two express the same information in different formats.                                                      |
| <network prefix>     | An IPv4 network prefix specifying a network. Used in conjunction with a netmask to determine which bits are significant. e.g. “192.168.0.0”.                                                          |
| <regular expression> | An extended regular expression as defined by the “grep” in the man page. (The value you provide here is passed on to “grep -E”.)                                                                      |
| <node id>            | ID of a node belonging to a cluster. This is a numerical value greater than zero.                                                                                                                     |
| <cluster id>         | A string specifying the name of a cluster.                                                                                                                                                            |
| <port>               | TCP/UDP port number.                                                                                                                                                                                  |

**Table 16 - Angled Brackets Parameter Description**

| Parameter  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <TCP port> | A TCP port number in the full allowable range [0...65535].                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <URL>      | <p>A normal URL, using any protocol that wget supports, including http, https, ftp, sftp, and tftp; or a pseudo-URL specifying an scp file transfer. The scp pseudo-URL format is scp://username:password@hostname/path/filename.</p> <p>Note that the path is an absolute path. Paths relative to the user's home directory are not currently supported. The implementation of ftp does not support authentication, so use scp or sftp for that.</p> <p>Note also that if you omit the “:password” part, you may be prompted for the password in a follow up prompt, where you can type it securely (without the characters being echoed). This prompt will occur if the “cli default prompt empty-password” setting is true; otherwise, the CLI will assume you do not want any password. If you include the “:” character, this will be taken as an explicit declaration that the password is empty, and you will not be prompted in any case.</p> |

### 3.1.7 Command Output Filtering

The MLNX-OS CLI supports filtering “show” commands to display lines containing or excluding certain phrases or characters. To filter the outputs of the “show” commands use the following format:

```
switch (config) # <show command> | [include | exclude] <extended regular expression>
[<ignore-case>] [next <lines>] [prev <lines>]
```

The filtering parameters are separated from the show command they filter by a pipe character (i.e. “|”). Quotation marks may be used to include or exclude a string including space, and multiple filters can be used simultaneously. For example:

```
switch (config) # <show command> | [include <extended regular expression> [<ignore-case>]
[next <lines>] [prev <lines>] | exclude <extended regular expression> [<ignore-case>]
[next <lines>] [prev <lines>]]
```

Examples:

```
switch (config) # switch (config) # switch (config) # show asic-version | include SX
SX module Version
SX 9.2.5440

arc-switch14 [standalone: master](config) # show module | exclude PS=====
Module Type Present Power Is Fatal =====
MGMT SX1036 1 N/A Not Fatal
FAN SXX0XX_FAN 1 N/A Not Fatal
CPU CPU 1 N/A Not Fatal

arc-switch14 [standalone: master] (config) # show interfaces | include "Eth|discard pac"
Eth1/1
0 discard packets
0 discard packets
Eth1/2
0 discard packets
0 discard packets
```

```

Eth1/3
0 discard packets
0 discard packets
Eth1/4
0 discard packets
0 discard packets
switch (config) # show interfaces | include "Tx" next 5 | exclude broad
Tx
0 packets
0 unicast packets
0 multicast packets
0 bytes
--
Tx
0 packets
0 unicast packets
0 multicast packets
0 bytes

```

## 3.2 Web Interface Overview

MLNX-OS® package equipped with web interface which is a web GUI that accept input and provide output by generating webpages which can be viewed by the user using a web browser.

The following web browsers are supported:

- Internet Explorer 8.0 or higher
- Chrome 18 or higher
- Mozilla Firefox 12 or higher
- Safari 5 or higher

The web interface makes available the following perspective tabs:

- Setup
- System
- Security
- Ports
- Status
- IB SM Management
- Fabric Inspector
- Ethernet Management
- IP Route
- Gateway



Make sure to save your changes before switching between menus or submenus. Click the “Save” button to the right of “Save Changes?”.

Figure 12: WebUI

**Mellanox MLNX-OS SX6036G Management Console**  
Host: switch-6287a4 User: admin Logout

Standalone Virtual IP Active node Subnet Manager is not running.

Setup System Security Ports Status IB SM Mgmt Fabric Insprtr ETH Mgmt IP Route Gateway Save

**Ports Information** Product Documents

Ports  
Phy Profile  
Monitor Session  
Protocol Type

**Port channels:** 1 2

**Port Info**

|                             |                                        |                        |                      |
|-----------------------------|----------------------------------------|------------------------|----------------------|
| Port number :               | 1                                      | Mac address :          | 00:02:c9:72:0d:ac    |
| Port type :                 | ETH                                    | MTU :                  | 1500 bytes           |
| Port description :          |                                        | Flow-control :         | receive off send off |
| Admin state :               | Enabled                                | Actual speed :         | 10 Gbps              |
| Operational state :         | Down                                   | Switchport mode :      | access               |
| PFC admin mode :            | Off                                    | PFC operational mode : | Off                  |
| Last clearing of counters : | Never                                  |                        |                      |
| 60 seconds ingress rate :   | 0 bits/sec, 0 bytes/sec, 0 packets/sec |                        |                      |
| 60 seconds egress rate :    | 0 bits/sec, 0 bytes/sec, 0 packets/sec |                        |                      |

**Port Counters** Clear Port 1 Counters

|                      |   |                      |   |
|----------------------|---|----------------------|---|
| RX packets :         | 0 | TX packets :         | 0 |
| RX unicast packets : | 0 | TX unicast packets : | 0 |

### 3.2.1 Setup Menu

The **Setup** menu makes available the following submenus (listed in order of appearance from top to bottom):

**Table 17 - WebUI Setup Submenus**

| Submenu Title      | Description                                                                                                                                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interfaces         | Obtains the status of, configures, or disables interfaces to the InfiniBand fabric. Thus, you can: set or clear the IP address and netmask of an interface; enable DHCP to dynamically assign the IP address and netmask; and set interface attributes such as MTU, speed, duplex, etc. |
| HA                 | Creates, joins or modifies an InfiniBand subnet.                                                                                                                                                                                                                                        |
| Routing            | Configures, removes or displays the default gateway, and the static and dynamic routes.                                                                                                                                                                                                 |
| Hostname           | Configures or modifies the hostname.<br>Configures or deletes static hosts.                                                                                                                                                                                                             |
| DNS                | Configures, removes, modifies or displays static and dynamic name servers.                                                                                                                                                                                                              |
| Login Messages     | Edits the login messages: Message of the Day (MOTD), Remote Login message, and Local Login message.                                                                                                                                                                                     |
| Address Resolution | Adds static and dynamic ARP entries, and clears the dynamic ARP cache.                                                                                                                                                                                                                  |



**Table 17 - WebUI Setup Submenus**

| Submenu Title       | Description                                                                                            |
|---------------------|--------------------------------------------------------------------------------------------------------|
| IPSec               | Configures IPSec.                                                                                      |
| Neighbors           | Displays IPv6 neighbor discovery protocol.                                                             |
| Virtualization      | Manages the virtualization and virtual machines.                                                       |
| Virtual Switch Mgmt | Configures the system profile.                                                                         |
| Web                 | Configures web user interface and proxy settings.                                                      |
| SNMP                | Configures SNMP attributes, SNMP admin user, and trap sinks.                                           |
| Email Alerts        | Configures the destination of email alerts and the recipients to be notified.                          |
| XML gateway         | Provides an XML request-response protocol to get and set hardware management information.              |
| Logs                | Sets up system log files, remote log sinks, and log formats.                                           |
| Configurations      | Manages, activates, saves, and imports MLNX-OS SwitchX configuration files, and executes CLI commands. |
| Date and Time       | Configures the date, time, and time zone of the switch system.                                         |
| NTP                 | Configures NTP (Network Time Protocol) and NTP servers.                                                |
| Licensing           | Manages MLNX-OS licenses.                                                                              |

### 3.2.2 System Menu

The **System** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 18 - WebUI System Submenus**

| Submenu Title    | Description                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Modules          | Displays a graphic illustration of the system modules. By moving the mouse over the ports in the front view, a pop-up caption is displayed to indicate the status of the port. The port state (active/down) is differentiated by a color scheme (green for active, gray/black for down). By moving the mouse over the rear view, a pop-up caption is displayed to indicate the leaf part information. |
| Inventory        | Displays a table with the following information about the system modules: module name, type, serial number, ordering part number and Asic firmware version.                                                                                                                                                                                                                                           |
| Power Management | Displays a table with the following information about the system power supplies: power supply name, power, voltage level, current consumption, and status. A total power summary table is also displayed providing the power used, the power capacity, and the power available.                                                                                                                       |
| MLNX-OS Upgrade  | Displays the installed MLNX-OS images (and the active partition), uploads a new image, and installs a new image.                                                                                                                                                                                                                                                                                      |

**Table 18 - WebUI System Submenus**

| Submenu Title | Description                                                                              |
|---------------|------------------------------------------------------------------------------------------|
| Reboot        | Reboots the system. Make sure that you save your configuration prior to clicking reboot. |

### 3.2.3 Security Menu

The **Security** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 19 - WebUI Security Submenus**

| Submenu Title  | Description                                                                                                                        |
|----------------|------------------------------------------------------------------------------------------------------------------------------------|
| Users          | Manages (setting up, removing, modifying) user accounts.                                                                           |
| Admin Password | Modifies the system administrator password.                                                                                        |
| SSH            | Displays and generate host keys.                                                                                                   |
| AAA            | Configures AAA (Authentication, Authorization, and Accounting) security services such as authentication methods and authorization. |
| Login Attempts | Manages login attempts                                                                                                             |
| RADIUS         | Manages Radius client.                                                                                                             |
| TACACS+        | Manages TACACS+ client.                                                                                                            |
| LDAP           | Manages LDAP client.                                                                                                               |
| Certificate    | Manages certificates.                                                                                                              |

### 3.2.4 Ports Menu

The Ports menu displays the port state and enables some configuration attributes of a selected port. It also enables modification of the port configuration. A graphical display of traffic over time (last hour or last day) through the port is also available.

**Table 20 - WebUI Ports Submenus**

| Submenu Title   | Description                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------|
| Ports           | Manages port attributes, counters, transceiver info and displays a graphical counters histogram. |
| Phy Profile     | Provides the ability to manage phy profiles.                                                     |
| Monitor Session | Displays monitor session summary and enables configuration of a selected session.                |
| Protocol Type   | Manages the link protocol type                                                                   |

### 3.2.5 Status Menu

The **Status** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 21 - WebUI Status Submenus**

| Submenu Title            | Description                                                                                                                                                                                                                                    |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary                  | Displays general information about the switch system and the MLNX-OS image, including current date and time, hostname, uptime of system, system memory, CPU load averages, etc.                                                                |
| Profile and Capabilities | Displays general information about the switch system capabilities such as the enabled profiles (e.g IB/ETH) and their corresponding values.                                                                                                    |
| Temperature              | Provides a graphical display of the switch module sensors' temperature levels over time (1 hour). It is possible to display either the temperature level of one module's sensor or the temperature levels of all the module sensors' together. |
| Power Supplies           | Provides a graphical display of one of the switch's power supplies voltage level over time (1 hour).                                                                                                                                           |
| Fans                     | Provides a graphical display of fan speeds over time (1 hour). The display is per fan unit within a fan module.                                                                                                                                |
| CPU Load                 | Provides a graphical display of the management CPU load over time (1 hour).                                                                                                                                                                    |
| Memory                   | Provides a graphical display of memory utilization over time (1 day).                                                                                                                                                                          |
| Network                  | Provides a graphical display of network usage (transmitted and received packets) over time (1 day). It also provides per interface statistics.                                                                                                 |
| Logs                     | Displays the system log messages. It is possible to display either the currently saved system log or a continuous system log.                                                                                                                  |
| Maintenance              | Performs specific maintenance operations automatically on a predefined schedule.                                                                                                                                                               |
| Alerts                   | Displays a list of the recent health alerts and enables the user to configure health settings.                                                                                                                                                 |
| Virtualization           | Displays the virtual machines, networks and volumes.                                                                                                                                                                                           |

### 3.2.6 IB SM Mgmt



The IB SM MGMT menu is not supported in Ethernet systems.

The **IB SM Mgmt** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 22 - WebUI IB SM Mgmt Submenus**

| Submenu Title | Description                                                                                                                                                                                                                                    |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary       | Displays the local Subnet Manager (SM) status (running time, failures, etc).                                                                                                                                                                   |
| Base SM       | Manages basic SM configuration (enabling SM, priority level, and restoring initial configuration).                                                                                                                                             |
| Advanced SM   | Manages basic SM configuration (enabling SM, priority level, and restoring initial configuration).                                                                                                                                             |
| Expert SM     | Configures security and GUID based prefixes (m_key, sm_key, sa_key, etc), and manages special SM attributes that should not be changed except by expert users of the Subnet Manager who understand the risks of manipulating these attributes. |
| Compute nodes | Adds compute nodes using network adapter port GUIDs.                                                                                                                                                                                           |
| Root nodes    | Adds root nodes using switch GUIDs.                                                                                                                                                                                                            |
| Partitions    | Manages partition keys (sets removes or displays the partition keys).                                                                                                                                                                          |
| Basic Qos     | Configures basic QoS attributes such as default QoS settings, and VL arbitration low and high entries. It also displays and manages SL-to-VL mappings.                                                                                         |

### 3.2.7 Fabric Inspector



The Fabric Inspctr menu is not applicable when the switch profile is not InfiniBand or VPI.



The Fabric Inspctr menu requires a license (LIC-fabric-inspector).

The **Fabric Inspctr** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 23 - WebUI Fabric Inspctr Submenus**

| Submenu Title | Description                                                                                                                                              |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary       | Displays a fabric status summary, including the time of last fabric update, what systems are in the fabric, what InfiniBand devices are identified, etc. |

**Table 23 - WebUI Fabric Inspctr Submenus**

| Submenu Title | Description                                                                                                                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IB Systems    | Displays information about all identified InfiniBand systems in the fabric (adapters, switches, etc).                                                                                                                                                                        |
| IB Nodes      | Displays information about InfiniBand nodes in the fabric. It is possible to filter display by the type of InfiniBand node (HCA adapter, switch, etc).                                                                                                                       |
| IB Ports      | Displays all active InfiniBand ports in the fabric. It is possible to filter display by the type of InfiniBand port (HCA port, switch port, switch management port, etc), by the port rate (speed or width), by the Subnet Manager status on the node, by node traffic, etc. |
| Connections   | Displays all active connections in the fabric. It is possible to filter display by the link type (switch to switch, switch to HCA, etc) and by the link rate (speed or width).                                                                                               |
| System Names  | Allows the mapping of System Names to GUIDs to ease system identification.                                                                                                                                                                                                   |

### 3.2.8 ETH Mgmt



The Eth Mgmt menu is not applicable when the switch profile is not Ethernet or VPI.

The **ETH Mgmt** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 24 - WebUI ETH Mgmt Submenus**

| Submenu Title         | Description                                                                        |
|-----------------------|------------------------------------------------------------------------------------|
| Spanning Tree         | Configures and monitors spanning tree protocol.                                    |
| MAC Table             | Configures static mac addresses in the switch, and displays the MAC address table. |
| Link Aggregation      | Configures and monitors aggregated Ethernet links (LAG) and configures LACP.       |
| VLAN                  | Manages the switch VLAN table.                                                     |
| IGMP Snooping         | Manages IGMP snooping in the switch.                                               |
| ACL                   | Manages Access Control in the switch.                                              |
| Priority Flow Control | Manages priority flow control.                                                     |

### 3.2.9 IP Route

The **IP Route** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 25 - WebUI IP Route Submenus**

| Submenu Title      | Description                                          |
|--------------------|------------------------------------------------------|
| Router Global      | Enables/disables IP Routing protocol on the machine. |
| IP Route           | Not implemented.                                     |
| IP Interface       | Not implemented.                                     |
| Address Resolution | Not implemented.                                     |
| IP Diagnostic      | Not implemented.                                     |

### 3.2.10 Gateway

The **Gateway** menu makes available the following sub-menus (listed in order of appearance from top to bottom):

**Table 26 - WebUI Gateway Submenus**

| Submenu Title        | Description                                                                |
|----------------------|----------------------------------------------------------------------------|
| Proxy-ARP Global     | Displays and manages IP Proxy-ARP.                                         |
| Proxy-ARP Interfaces | Displays Proxy-ARP interfaces.                                             |
| Address Resolution   | Displays the address resolution (ARP) table.                               |
| Routing              | Configures, removes or displays the routing table per Proxy-ARP interface. |

## 3.3 Secure Shell (SSH)



It is recommended not to use more than 100 concurrent SSH sessions to the switch.

### 3.3.1 Adding a Host and Providing an SSH Key

➤ *To add entries to the global known-hosts configuration file and its SSH value:*

**Step 1.** Change to Config mode Run:

```
switch [standalone: master] > enable
switch [standalone: master] # configure terminal
switch [standalone: master] (config) #
```

**Step 2.** Add an entry to the global known-hosts configuration file and its SSH value. Run:

```
switch [standalone: master] (config) # ssh client global known-host "myserver ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAIEAsXeklqc8T0EN2mnMcVcfhueaRYzIVqt4rVsrERIjmlJh4mkYYIa8hGGikNa+
t5xw2dRrNxnHYLK51bUsSG1ZNwZT1Dpme3pAZeMY7G4ZMgGIW9x0uaXgAA3eBeoUjFdi6+1BqchWk0nTb+gMfI/
MK/heQNns7AtTrvqg/05ryIc="
switch [standalone: master] (config) #
```

**Step 3.** Verify what keys exist in the host. Run:

```
switch [standalone: master] (config) # show ssh client
SSH client Strict Hostkey Checking: ask

SSH Global Known Hosts:
 Entry 1: myserver
 Finger Print: d5:d7:be:d7:6c:b1:e4:16:df:61:25:2f:b1:53:a1:06

No SSH user identities configured.

No SSH authorized keys configured.

switch [standalone: master] (config) #
```

### 3.3.2 Retrieving Return Codes when Executing Remote Commands

➤ *To stop the CLI and set the system to send return errors if some commands fail:*

**Step 1.** Connect to the system from the host SSH.

**Step 2.** Add the -h parameter after the cli (as shown in the example below) to notify the system to halt on failure and pass through the exit code.

```
ssh <username>@<hostname> cli -h "enable" "show interfaces brief"
```

## 3.4 Commands

### 3.4.1 CLI Session

This chapter displays all the relevant commands used to manage CLI session terminal.

#### **cli clear-history**

##### **cli clear-history**

Clears the command history of the current user.

|                           |                                                          |
|---------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                      |
| <b>Default</b>            | N/A                                                      |
| <b>Configuration Mode</b> | Config                                                   |
| <b>History</b>            | 3.1.0000                                                 |
| <b>Role</b>               | admin                                                    |
| <b>Example</b>            | switch (config) # cli clear-history<br>switch (config) # |
| <b>Related Commands</b>   | N/A                                                      |
| <b>Note</b>               |                                                          |



## cli default

**cli default {auto-logout <minutes> | paging enable | prefix-modes {enable | show-config} | progress enable | prompt {confirm-reload | confirm-reset | confirm-unsaved | empty-password}}**

**no cli default {auto-logout | paging enable | prefix-modes {enable | show-config} | progress enable prompt {confirm-reload | confirm-reset | confirm-unsaved | empty-password}}**

Configures default CLI options for all future sessions.

The no form of the command deletes or disables the default CLI options.

|                           |                                     |                                                                                                                                                                                                                                                                                                       |
|---------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | minutes                             | Configures keyboard inactivity timeout for automatic logout. Range is 0-35791 minutes. Setting the value to 0 or using the no form of the command disables the auto-logout.                                                                                                                           |
|                           | paging enable                       | Enables text viewing one screen at a time.                                                                                                                                                                                                                                                            |
|                           | prefix-modes {enable   show-config} | Configures the prefix modes feature of CLI. <ul style="list-style-type: none"> <li>“prefix-modes enable” enables prefix modes for current and all future sessions</li> <li>“prefix-modes show-config” uses prefix modes in “show configuration” output for current and all future sessions</li> </ul> |
|                           | progress enable                     | Enables progress updates.                                                                                                                                                                                                                                                                             |
|                           | prompt confirm-reload               | Prompts for confirmation before rebooting.                                                                                                                                                                                                                                                            |
|                           | prompt confirm-reset                | Prompts for confirmation before resetting to factory state.                                                                                                                                                                                                                                           |
|                           | prompt confirm-unsaved              | Confirms whether or not to save unsaved changes before rebooting.                                                                                                                                                                                                                                     |
|                           | prompt empty-password               | Prompts for a password if none is specified in a pseudo-URL for SCP.                                                                                                                                                                                                                                  |
| <b>Default</b>            | N/A                                 |                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                              |                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                            |                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                               |                                                                                                                                                                                                                                                                                                       |

---

**Example**

```
switch (config) # cli default prefix-modes enable
switch (config) # show cli
CLI current session settings:
 Maximum line size: 8192
 Terminal width: 171 columns
 Terminal length: 38 rows
 Terminal type: xterm
 X display setting: (none)
 Auto-logout: disabled
 Paging: enabled
 Progress tracking: enabled
 Prefix modes: disabled

CLI defaults for future sessions:
 Auto-logout: disabled
 Paging: enabled
 Progress tracking: enabled
 Prefix modes: enabled (and use in 'show configuration')

Settings for both this session and future ones:
 Show hidden config: yes
 Confirm losing changes: yes
 Confirm reboot/shutdown: no
 Confirm factory reset: yes
 Prompt on empty password: yes
switch (config) #
```

---

**Related Commands**    show cli

---

**Note**

---

## cli session

**cli session {auto-logout <minutes> | paging enable | prefix-modes {enable | show-config} | progress enable | terminal {length <size> | resize | type <terminal-type> | width} | x-display full <display>}**  
**no cli session {auto-logout | paging enable | prefix-modes {enable | show-config} | progress enable | terminal type | x-display}**

Configures default CLI options for all future sessions.  
 The no form of the command deletes or disables the CLI sessions.

|                           |                                   |                                                                                                                                                                                                                                                                                                       |
|---------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | minutes                           | Configures keyboard inactivity timeout for automatic logout. Range is 0-35791 minutes. Setting the value to 0 or using the no form of the command disables the auto logout.                                                                                                                           |
|                           | paging enable                     | Enables text viewing one screen at a time.                                                                                                                                                                                                                                                            |
|                           | prefix-modes enable   show-config | Configures the prefix modes feature of CLI. <ul style="list-style-type: none"> <li>“prefix-modes enable” enables prefix modes for current and all future sessions</li> <li>“prefix-modes show-config” uses prefix modes in “show configuration” output for current and all future sessions</li> </ul> |
|                           | progress enable                   | Enables progress updates.                                                                                                                                                                                                                                                                             |
|                           | terminal length                   | Sets the number of lines for the current terminal. Valid range is 5-999.                                                                                                                                                                                                                              |
|                           | terminal resize                   | Resizes the CLI terminal settings (to match the actual terminal window).                                                                                                                                                                                                                              |
|                           | terminal-type                     | Sets the terminal type. Valid options are: <ul style="list-style-type: none"> <li>ansi</li> <li>console</li> <li>dumb</li> <li>linux</li> <li>unknown</li> <li>vt52</li> <li>vt100</li> <li>vt102</li> <li>vt220</li> <li>vt320</li> <li>xterm</li> </ul>                                             |
|                           | terminal width                    | Sets the width of the terminal in characters. Valid range is 34-999.                                                                                                                                                                                                                                  |
|                           | x-display full <display>          | Specifies the display as a raw string, e.g localhost:0.0.                                                                                                                                                                                                                                             |
| <b>Default</b>            | N/A                               |                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                            |                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                          |                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                             |                                                                                                                                                                                                                                                                                                       |

|                |                                                                |
|----------------|----------------------------------------------------------------|
| <b>Example</b> | switch (config) # cli session auto-logout<br>switch (config) # |
|----------------|----------------------------------------------------------------|

|                         |               |
|-------------------------|---------------|
| <b>Related Commands</b> | show terminal |
|-------------------------|---------------|

|             |
|-------------|
| <b>Note</b> |
|-------------|

---

## terminal

**terminal {length <number of lines> | resize | type <terminal type> | width <number of characters>}**  
**no terminal type**

Configures default CLI options for all future sessions.  
 The no form of the command clears the terminal type.

|                           |                                                            |                                                                                                                |
|---------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | length                                                     | Sets the number of lines for this terminal<br>Range: 5-999                                                     |
|                           | resize                                                     | Resizes the CLI terminal settings (to match with real terminal)                                                |
|                           | type                                                       | Sets the terminal type. Possible values: ansi, console, dumb, linux, screen, vt52, vt100, vt102, vt220, xterm. |
|                           | width                                                      | Sets the width of this terminal in characters<br>Range: 34-999                                                 |
| <b>Default</b>            | N/A                                                        |                                                                                                                |
| <b>Configuration Mode</b> | Config                                                     |                                                                                                                |
| <b>History</b>            | 3.1.0000                                                   |                                                                                                                |
| <b>Role</b>               | admin                                                      |                                                                                                                |
| <b>Example</b>            | switch (config) # terminal length 500<br>switch (config) # |                                                                                                                |
| <b>Related Commands</b>   | show terminal                                              |                                                                                                                |
| <b>Note</b>               |                                                            |                                                                                                                |

## show cli

### show cli

Displays the CLI configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show cli CLI current session settings:   Maximum line size:      8192   Terminal width:         171 columns   Terminal length:        38 rows   Terminal type:          xterm   X display setting:      (none)   Auto-logout:            disabled   Paging:                 enabled   Progress tracking:      enabled   Prefix modes:           disabled  CLI defaults for future sessions:   Auto-logout:            disabled   Paging:                 enabled   Progress tracking:      enabled   Prefix modes:           enabled (and use in 'show configuration')  Settings for both this session and future ones:   Show hidden config:     yes   Confirm losing changes: yes   Confirm reboot/shutdown: no   Confirm factory reset:  yes   Prompt on empty password: yes switch (config) #</pre> |
| <b>Related Commands</b>   | cli default                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## 3.4.2 Banner

### banner login

**banner {login | login-remote | login-local} <string>**  
**no banner login**

Sets the CLI welcome banner message. The login-remote refers to the SSH connections banner, while the login-local refers to the serial connection banner. The no form of the command resets the system login banner to its default.

|                           |                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | string<br>Text string.                                                                                                                               |
| <b>Default</b>            | “Mellanox MLNX-OS Switch Management”                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # banner login example switch (config) # show banner Banners:   MOTD: Mellanox Switch    Login: example switch (config) #</pre> |
| <b>Related Commands</b>   | show banner                                                                                                                                          |
| <b>Note</b>               | If more than one word is used (there is a space) quotation marks should be added (i.e. “xxxx xxxx”).                                                 |

## banner login-local

**banner login-local <string>**

**no banner login-local**

Sets system login local banner.

The no form of the command resets the banner.

|                           |                                                                                                      |              |
|---------------------------|------------------------------------------------------------------------------------------------------|--------------|
| <b>Syntax Description</b> | string                                                                                               | Text string. |
| <b>Default</b>            | N/A                                                                                                  |              |
| <b>Configuration Mode</b> | Config                                                                                               |              |
| <b>History</b>            | 3.1.0000                                                                                             |              |
| <b>Role</b>               | admin                                                                                                |              |
| <b>Example</b>            | switch (config) # banner login-local Testing<br>switch (config) #                                    |              |
| <b>Related Commands</b>   | show banner                                                                                          |              |
| <b>Note</b>               | If more then one word is used (there is a space) quotation marks should be added (i.e. "xxxx xxxx"). |              |



## banner login-remote

**banner login-remote <string>**

**no banner login-remote**

Sets system login remote banner.

The no form of the command resets the banner.

|                           |                                                                                                      |              |
|---------------------------|------------------------------------------------------------------------------------------------------|--------------|
| <b>Syntax Description</b> | string                                                                                               | Text string. |
| <b>Default</b>            | N/A                                                                                                  |              |
| <b>Configuration Mode</b> | Config                                                                                               |              |
| <b>History</b>            | 3.1.0000                                                                                             |              |
| <b>Role</b>               | admin                                                                                                |              |
| <b>Example</b>            | switch (config) # banner login-remote Testing<br>switch (config) #                                   |              |
| <b>Related Commands</b>   | show banner                                                                                          |              |
| <b>Note</b>               | If more then one word is used (there is a space) quotation marks should be added (i.e. "xxxx xxxx"). |              |

## banner motd

**banner motd <string>**  
**no banner motd**

Sets the message of the day banner.  
 The no form of the command resets the system Message of the Day banner.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | string<br>Text string.                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>            | "Mellanox Switch"                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # banner motd "My Banner" switch (config) # show banner Banners:   MOTD: My-Banner   Login: Mellanox MLNX-OS Switch Management switch (config) #</pre>                                                                                                                                                                                                                                                          |
| <b>Related Commands</b>   | show banner                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If more than one word is used (there is a space) quotation marks should be added (i.e. "xxxx xxxx").</li> <li>• To insert a multi-line MotD, hit Ctrl-V (escape sequence) followed by Ctrl-J (new line sequence). The symbol "^J" should appear. Then, whatever is typed after it becomes the new line of the MotD. Remember to also include the string between quotation marks.</li> </ul> |

## show banner

### show banner

Displays configured banners.

|                           |                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                             |
| <b>Default</b>            | N/A                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                        |
| <b>Role</b>               | unpriv/monitor/admin                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # show banner Banners:   MOTD: Testing   Login: Mellanox MLNX-OS Switch Management switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>banner login banner motd</pre>                                                                                             |
| <b>Note</b>               |                                                                                                                                 |

### 3.4.3 SSH

#### ssh server enable

**ssh server enable**  
**no ssh server enable**

Enables the SSH server.  
 The no form of the command disables the SSH server.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | SSH server is enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # ssh server enable switch (config) # show ssh server SSH server configuration:   SSH server enabled:          yes   Server security strict mode: no   Minimum protocol version: 2   TCP forwarding enabled:      yes   X11 forwarding enabled:      no   SSH server ports:           22    Interface listen enabled: yes   No Listen Interfaces.  Host Key Finger Prints:   RSA v1 host key: a0:63:db:96:e2:95:5a:5a:fd:a8:d0:f4:ab:e3:5f:f8   RSA v2 host key: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6   DSA v2 host key: 7c:4a:f7:72:51:67:b5:0b:cd:a2:d2:b9:f3:be:3e:68 switch (config) #</pre> |
| <b>Related Commands</b>   | show ssh server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Note</b>               | Disabling SSH server does not terminate existing SSH sessions, it only prevents new ones from being established.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## ssh server host-key

**ssh server host-key {<key type> {private-key <private-key>| public-key <public-key>} | generate}**

Manipulates host keys for SSH.

|                           |                                |                                                                                                            |
|---------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | key type                       | <ul style="list-style-type: none"> <li>rsa1 - RSAv1</li> <li>rsa2 - RSAv2</li> <li>dsa2 - DSAv2</li> </ul> |
|                           | private-key                    | Sets new private-key for the host keys of the specified type.                                              |
|                           | public-key                     | Sets new public-key for the host keys of the specified type.                                               |
|                           | generate                       | Generates new RSA and DSA host keys for SSH.                                                               |
| <b>Default</b>            | SSH keys are locally generated |                                                                                                            |
| <b>Configuration Mode</b> | Config                         |                                                                                                            |
| <b>History</b>            | 3.1.0000                       |                                                                                                            |
| <b>Role</b>               | admin                          |                                                                                                            |

**Example**

```

switch (config) # ssh server host-key dsa2 private-key
Key: *****
Confirm: *****
switch (config) # show ssh server host-keys
SSH server configuration:
 SSH server enabled: yes
 Minimum protocol version: 2
 X11 forwarding enabled: no
 SSH server ports: 22

 Interface listen enabled: yes
 No Listen Interfaces.

Host Key Finger Prints:
 RSA v1 host key: a0:63:db:96:e2:95:5a:5a:fd:a8:d0:f4:ab:e3:5f:f8
 RSA v2 host key: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6
 DSA v2 host key: 7c:4a:f7:72:51:67:b5:0b:cd:a2:d2:b9:f3:be:3e:68

Host Keys:
 RSA v1 host key: "switch-5ea5d8 1024 35
12457497995374010105491416867919987976776882016984375942831915584962796
99375406596085804272219042450456598705866658144854493132172365068789517
13570509420864336951833046700451354269467758379288848962624165330724512
16091899983038691571036219385577978596282214644533444813712105628654158
3022982220576029771297093"
 RSA v2 host key: "switch-5ea5d8 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAA-
IEArB9i50nukAHNU0kwpCmEl0m88kJgBzL22+F5tfaSn+S0pVYxrceZeyuzXsoZ1VtFTk2-
FydwY0YvMS0Kcv2PuCrPZV/
GYd31QEnn22rEmrLPrKCrMl1XlUy6DFlr30gWwm1baobmDlG/gSziWz/gc4Jgqf2CyX-
Fq4pzaR1jar1Vk="
 DSA v2 host key: "switch-5ea5d8 ssh-dss AAAAB3NzaC1kc3MAAAC-
BAMEJ3S+nyaHhRbwv3tJqLWttDC35RZVC5iG4ZEVMMHp28VL940cyyuGh39VCdM9pEVaI7h
zZrsgHrNqakb/YLD/7anGH3wpl9Fx8lfe0RH3bloJzG+mJ6R5momdoPCrKwEKiKABKE00-
jLzLVznpP0IHxjwF+TbR3dK5HwVzQYw/bAAAAFQCBoDPqBZza+2KylKlZUsbZ2pKhgQAAA-
IAJK+StiQdt0Rw1B5UCMzTrTef5L07DSfVreMEYtTRnBBtgVSNqQFwpsQIYbVDHQR9T6qCM
4V039DuHUGQ1TMDIX7t+9mfbB87YyUu5a/ndbf3GhNhXHWwbzlr9hgLL7FSHA7DYH7bV0Z-
RlqxH64eQKGZqy1ps/F4E31lyn7GC4EQAAAIA/2osHipXF+NRjplgfmHR0VVf/mGE9Vzc9/
AMUxLJJn5VhvEJ5CZW9cI+LxM0Jojh0j3YW3B1czGxR0bDA9vUbKXTNc8bkgoUrxySAH1rH
N0PqJgeT4L009AItSp3m1mxHqdS7jixfTv0TEKWxrgpczlmTB8+zjhUah/YuuBl2H
g=="
switch (config) #

```

**Related Commands**

```
show ssh server
```

**Note**

## ssh server listen

**ssh server listen {enable | interface <inf>}**  
**no ssh server listen {enable | interface <inf>}**

Enables the listen interface restricted list for SSH. If enabled, and at least one non-DHCP interface is specified in the list, the SSH connections are only accepted on those specified interfaces.

The no form of the command disables the listen interface restricted list for SSH. When disabled, SSH connections are not accepted on any interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Enables SSH interface restrictions on access to this system.                                     |
|                           | interface <inf>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Adds interface to SSH server access restriction list. Possible interfaces are “lo”, and “mgmt0”. |
| <b>Default</b>            | SSH listen is enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # ssh server listen enable switch (config) # show ssh server SSH server configuration:   SSH server enabled:      yes   Minimum protocol version: 2   X11 forwarding enabled:  no   SSH server ports:       22  Interface listen enabled: yes No Listen Interfaces.  Host Key Finger Prints:   RSA v1 host key: a0:63:db:96:e2:95:5a:5a:fd:a8:d0:f4:ab:e3:5f:f8   RSA v2 host key: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6   DSA v2 host key: 7c:4a:f7:72:51:67:b5:0b:cd:a2:d2:b9:f3:be:3e:68 switch (config) #</pre> |                                                                                                  |
| <b>Related Commands</b>   | show ssh server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |

## ssh server min-version

**ssh server min-version <version>**

**no ssh server min-version**

Sets the minimum version of the SSH protocol that the server supports.  
The no form of the command resets the minimum version of SSH protocol supported.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Possible versions are 1 and 2. |
| <b>Default</b>            | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |
| <b>Example</b>            | <pre>switch (config) # ssh server min-version 2 switch (config) # show ssh server SSH server configuration:   SSH server enabled:      yes   Minimum protocol version: 2   X11 forwarding enabled:  no   SSH server ports:       22    Interface listen enabled: yes   No Listen Interfaces.  Host Key Finger Prints:   RSA v1 host key: a0:63:db:96:e2:95:5a:5a:fd:a8:d0:f4:ab:e3:5f:f8   RSA v2 host key: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6   DSA v2 host key: 7c:4a:f7:72:51:67:b5:0b:cd:a2:d2:b9:f3:be:3e:68 switch (config) #</pre> |                                |
| <b>Related Commands</b>   | show ssh server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |



## ssh server ports

**ssh server ports {<port1> [<port2>...]}**

Specifies which ports the SSH server listens on.

| Syntax Description | port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Port number in [1...65535]. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Default            | 22.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |
| Example            | <pre>switch (config) # ssh server ports 22 switch (config) # show ssh server SSH server configuration:   SSH server enabled:      yes   Minimum protocol version: 2   X11 forwarding enabled:  no   SSH server ports:       22    Interface listen enabled: yes   No Listen Interfaces.  Host Key Finger Prints:   RSA v1 host key: a0:63:db:96:e2:95:5a:5a:fd:a8:d0:f4:ab:e3:5f:f8   RSA v2 host key: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6   DSA v2 host key: 7c:4a:f7:72:51:67:b5:0b:cd:a2:d2:b9:f3:be:3e:68 switch (config) #</pre> |                             |
| Related Commands   | show ssh server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
| Note               | <ul style="list-style-type: none"> <li>Multiple ports can be specified by repeating the &lt;port&gt; parameter</li> <li>The command will remove any previous ports if not listed in the command</li> </ul>                                                                                                                                                                                                                                                                                                                                        |                             |

## ssh server x11-forwarding

**ssh server x11-forwarding enable**  
**no ssh server x11-forwarding enable**

Enables X11 forwarding on the SSH server.  
 The no form of the command disables X11 forwarding.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | X11-forwarding is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch (config) # ssh server x11-forwarding enable switch (config) # show ssh server SSH server configuration:   SSH server enabled:      yes   Minimum protocol version: 2   X11 forwarding enabled:  yes   SSH server ports:       22  Interface listen enabled: yes No Listen Interfaces.  Host Key Finger Prints:   RSA v1 host key: a0:63:db:96:e2:95:5a:5a:fd:a8:d0:f4:ab:e3:5f:f8   RSA v2 host key: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6   DSA v2 host key: 7c:4a:f7:72:51:67:b5:0b:cd:a2:d2:b9:f3:be:3e:68 switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## ssh client global

**ssh client global {host-key-check <policy>} | known-host <known-host-entry>}**  
**no ssh client global {host-key-check | known-host localhost}**

Configures global SSH client settings.

The no form of the command negates global SSH client settings.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | host-key-check <policy>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sets SSH client configuration to control how host key checking is performed. This parameter may be set in 3 ways. <ul style="list-style-type: none"> <li>If set to “no” it always permits connection, and accepts any new or changed host keys without checking</li> <li>If set to “ask” it prompts user to accept new host keys, but does not permit a connection if there was already a known host entry that does not match the one presented by the host</li> <li>If set to “yes” it only permits connection if a matching host key is already in the known hosts file</li> </ul> |
|                           | known-host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Adds an entry to the global known-hosts configuration file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                           | known-host-entry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Adds/removes an entry to/from the global known-hosts configuration file. The entry consist of “<IP> <key-type> <key>”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>            | host-key-check - ask, no keys are configured by default                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch (config) # ssh client global host-key-check no switch (config) # ssh client global known-host "72.30.2.2 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAIEArB9i50nukAHNUOkwpCmEl0m88kJgB- zL22+F5tfaSn+S0pVYxrceZeyuzXsoZ1VtFTk2FydwY0YvMS0Kcv2PuCrPZV/ GYd31QEnn22rEmr1PrKCrMl1XlUy6DFlr30gwWm1baobmDlG/gSziwz/gc4Jgqf2CyX- Fq4pzaR1jar1Vk="  switch (config) # show ssh client SSH client Strict Hostkey Checking: ask  SSH Global Known Hosts:   Entry 1: 72.30.2.2            Finger Print: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6  No SSH user identities configured.  No SSH authorized keys configured.  switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                         |                 |
|-------------------------|-----------------|
| <b>Related Commands</b> | show ssh client |
|-------------------------|-----------------|

|             |
|-------------|
| <b>Note</b> |
|-------------|

## ssh client user

**ssh client user <username> {authorized-key sshv2 <public key> | identity <key type> {generate | private-key [<private key>] | public-key [<public key>]} | known-host <known host> remove}**  
**no ssh client user admin {authorized-key sshv2 <public key ID> | identity <key type>}**

Adds an entry to the global known-hosts configuration file, either by generating new key, or by adding manually a public or private key.

The no form of the command removes a public key from the specified user's authorized key list, or changes the key type.

|                           |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                             |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | username                                                                                                                                                                                                                                                                                                                             | The specified user must be a valid account on the system. Possible values for this parameter are “admin”, “monitor”, “xmladmin”, and “xmluser”.             |
|                           | authorized-key sshv2 <public key>                                                                                                                                                                                                                                                                                                    | Adds the specified key to the list of authorized SSHv2 RSA or DSA public keys for this user account. These keys can be used to log into the user's account. |
|                           | identity <key type>                                                                                                                                                                                                                                                                                                                  | Sets certain SSH client identity settings for a user, dsa2 or rsa2.                                                                                         |
|                           | generate                                                                                                                                                                                                                                                                                                                             | Generates SSH client identity keys for specified user.                                                                                                      |
|                           | private-key                                                                                                                                                                                                                                                                                                                          | Sets private key SSH client identity settings for the user.                                                                                                 |
|                           | public-key                                                                                                                                                                                                                                                                                                                           | Sets public key SSH client identity settings for the user.                                                                                                  |
|                           | known-host <known host> remove                                                                                                                                                                                                                                                                                                       | Removes host from user's known host file.                                                                                                                   |
| <b>Default</b>            | No keys are created by default                                                                                                                                                                                                                                                                                                       |                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # ssh client user admin known-host 172.30.1.116 remove switch (config) #</pre>                                                                                                                                                                                                                                  |                                                                                                                                                             |
| <b>Related Commands</b>   | show ssh client                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                             |
| <b>Note</b>               | If a key is being pasted from a cut buffer and was displayed with a paging program, it is likely that newline characters have been inserted, even if the output was not long enough to require paging. One can specify “no cli session paging enable” before running the “show” command to prevent the newlines from being inserted. |                                                                                                                                                             |

## slogin

**slogin [<slogin options>] <hostname>**

Invokes the SSH client. The user is returned to the CLI when SSH finishes.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | slogin options                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | usage: slogin [-1246AaCfkgkNnqsTtVvXxY] [-b bind_address] [-c cipher_spec] [-D port] [-e escape_char] [-F configfile] [-i identity_file] [-L port:host:hostport] [-l login_name] [-m mac_spec] [-o option] [-p port] [-R port:host:hostport] [user@]host-name [command] |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | monitor/admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # slogin 192.168.10.70 The authenticity of host '192.168.10.70 (192.168.10.70)' can't be established. RSA key fingerprint is 2e:ad:2d:23:45:4e:47:e0:2c:ae:8c:34:f0:1a:88:cb. Are you sure you want to continue connecting (yes/no)? yes Warning: Permanently added '192.168.10.70' (RSA) to the list of known hosts.  Mellanox MLNX-OS Switch Management  Last login: Sat Feb 28 22:55:17 2009 from 10.208.0.121  Mellanox Switch  switch (config) #</pre> |                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                         |

## show ssh client

### show ssh client

Displays the client configuration of the SSH server.

|                           |                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                             |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # show ssh client SSH client Strict Hostkey Checking: ask  SSH Global Known Hosts:   Entry 1: 72.30.2.2     Finger Print: 1e:b7:8b:ec:ab:35:98:be:6b:d6:12:c2:18:72:12:d6  No SSH user identities configured.  No SSH authorized keys configured.  switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                 |

## show ssh server

### show ssh server

Displays SSH server configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                           | 3.4.0000 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show ssh server SSH server configuration:   SSH server enabled:          yes   Server security strict mode: no   Minimum protocol version:    2   TCP forwarding enabled:      yes   X11 forwarding enabled:      no   SSH server ports:            22    Interface listen enabled:    yes   No Listen Interfaces.  Host Key Finger Prints and Key Lengths:   RSA v1 host key: 5f:4e:5f:4a:81:bb:6a:b4:06:52:77:eb:d3:ad:78:92 (2048)   RSA v2 host key: 15:e2:a8:45:1c:58:1b:00:cc:29:ec:00:38:83:49:00 (2048)   DSA v2 host key: df:c0:ac:a6:3e:a5:52:a5:d1:f6:22:37:ef:f1:08:f9 (1024)  switch (config) #</pre> |
| <b>Related Commands</b>   | ssh server                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



### 3.4.4 Remote Login

#### telnet

##### telnet

Logs into another system using telnet.

|                           |                                                |
|---------------------------|------------------------------------------------|
| <b>Syntax Description</b> | N/A                                            |
| <b>Default</b>            | N/A                                            |
| <b>Configuration Mode</b> | Config                                         |
| <b>History</b>            | 3.1.0000                                       |
| <b>Role</b>               | admin                                          |
| <b>Example</b>            | switch (config) # (config) # telnet<br>telnet> |
| <b>Related Commands</b>   | telnet-server                                  |
| <b>Note</b>               |                                                |

## telnet-server enable

**telnet-server enable**  
**no telnet-server enable**

Enables the telnet server.  
The no form of the command disables the telnet server.

|                           |                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                          |
| <b>Default</b>            | Telnet server is disabled                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                     |
| <b>Role</b>               | admin                                                                                                        |
| <b>Example</b>            | switch (config) # telnet-server enable<br>switch (config) # show telnet-server<br>Telnet server enabled: yes |
| <b>Related Commands</b>   | show telnet-server                                                                                           |
| <b>Note</b>               |                                                                                                              |

## show telnet-server

### show telnet-server

Displays telnet server settings.

|                           |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                     |
| <b>Default</b>            | N/A                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                |
| <b>Role</b>               | admin                                                                                   |
| <b>Example</b>            | switch (config) # show telnet-server<br>Telnet server enabled: yes<br>switch (config) # |
| <b>Related Commands</b>   | telnet-server enable                                                                    |
| <b>Note</b>               |                                                                                         |

### 3.4.5 Web Interface

#### web auto-logout

**web auto-logout <number of minutes>**  
**no web auto-logout <number of minutes>**

Configures length of user inactivity before auto-logout of a web session.  
 The no form of the command disables the web auto-logout (web sessions will never logged out due to inactivity).

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | number of minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The length of user inactivity in minutes.<br>0 will disable the inactivity timer (same as a “no web auto-logout” command). |
| <b>Default</b>            | 60 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                            |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Updated Example                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # web auto-logout 60 switch (config) # show web  Web User Interface: Web interface enabled:  yes HTTP enabled:         yes HTTP port:            80 HTTP redirect to HTTPS: no HTTPS enabled:        yes HTTPS port:           443 HTTPS ssl-ciphers:    all HTTPS certificate name: default-cert Listen enabled:       yes No Listen Interfaces.  Inactivity timeout:    1 hr Session timeout:      2 hr 30 min Session renewal:      30 min  Web file transfer proxy: Proxy enabled: no  Web file transfer certificate authority: HTTPS server cert verify: yes HTTPS supplemental CA list: default-ca-list switch (config) #</pre> |                                                                                                                            |
| <b>Related Commands</b>   | show web                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                            |
| <b>Note</b>               | The no form of the command does not automatically log users out due to inactivity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                            |

## web cache-enable

**web cache-enable**  
**no web cache-enable**

Enables web clients to cache webpages.  
The no form of the command disables web clients from caching webpages.

|                           |                                       |
|---------------------------|---------------------------------------|
| <b>Syntax Description</b> | N/A                                   |
| <b>Default</b>            | Enabled                               |
| <b>Configuration Mode</b> | Config                                |
| <b>History</b>            | 3.4.1100                              |
| <b>Role</b>               | admin                                 |
| <b>Example</b>            | switch (config) # no web cache-enable |
| <b>Related Commands</b>   | N/A                                   |

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### Note

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## web client cert-verify

**web client cert-verify**  
**no web client cert-verify**

Enables verification of server certificates during HTTPS file transfers.  
The no form of the command disables verification of server certificates during HTTPS file transfers.

|                           |                                          |
|---------------------------|------------------------------------------|
| <b>Syntax Description</b> | N/A                                      |
| <b>Default</b>            | N/A                                      |
| <b>Configuration Mode</b> | Config                                   |
| <b>History</b>            | 3.2.3000                                 |
| <b>Role</b>               | admin                                    |
| <b>Example</b>            | switch (config) # web client cert-verify |
| <b>Related Commands</b>   | N/A                                      |
| <b>Note</b>               |                                          |

## web client ca-list

**web client ca-list {<ca-list-name> | default-ca-list | none}**  
**no web client ca-list**

Configures supplemental CA certificates for verification of server certificates during HTTPS file transfers.

The no form of the command uses no supplemental certificates.

|                           |                                                      |                                                      |
|---------------------------|------------------------------------------------------|------------------------------------------------------|
| <b>Syntax Description</b> | ca-list-name                                         | Specifies CA list to configure.                      |
|                           | default-ca-list                                      | Configures default supplemental CA certificate list. |
|                           | none                                                 | Uses no supplemental certificates.                   |
| <b>Default</b>            | default-ca-list                                      |                                                      |
| <b>Configuration Mode</b> | Config                                               |                                                      |
| <b>History</b>            | 3.2.3000                                             |                                                      |
| <b>Role</b>               | admin                                                |                                                      |
| <b>Example</b>            | switch (config) # web client ca-list default-ca-list |                                                      |
| <b>Related Commands</b>   | N/A                                                  |                                                      |
| <b>Note</b>               |                                                      |                                                      |

## web enable

**web enable**  
**no web enable**

Enables the web-based management console.  
 The no form of the command disables the web-based management console.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>            | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                           | 3.4.0000 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Example</b>            | <pre> switch (config) # web enable switch (config) # show web  Web User Interface: Web interface enabled:  yes HTTP enabled:          yes HTTP port:             80 HTTP redirect to HTTPS: no HTTPS enabled:         yes HTTPS port:            443 HTTPS ssl-ciphers:     all HTTPS certificate name: default-cert Listen enabled:        yes No Listen Interfaces.  Inactivity timeout:    1 hr Session timeout:       2 hr 30 min Session renewal:       30 min  Web file transfer proxy: Proxy enabled: no  Web file transfer certificate authority: HTTPS server cert verify: yes HTTPS supplemental CA list: default-ca-list switch (config) # </pre> |
| <b>Related Commands</b>   | show web                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



## web http

**web http {enable | port <port number> | redirect}**

**no web http {enable | port | redirect}**

Configures HTTP access to the web-based management console.

The no form of the command negates HTTP settings for the web-based management console.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Enables HTTP access to the web-based management console.                                                                                                                         |
|                           | port number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sets a port for HTTP access.                                                                                                                                                     |
|                           | redirect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Enables redirection to HTTPS. If HTTP access is enabled, this specifies whether a redirect from the HTTP port to the HTTPS port should be issued to mandate secure HTTPS access. |
| <b>Default</b>            | HTTP is enabled<br>HTTP TCP port is 80<br>HTTP redirect to HTTPS is disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                  |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Updated Example                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                  |
| <b>Example</b>            | <pre> switch (config) # web http enable switch (config) # show web  Web User Interface:   Web interface enabled:  yes   HTTP enabled:          yes   HTTP port:             80   HTTP redirect to HTTPS: no   HTTPS enabled:         yes   HTTPS port:            443   HTTPS ssl-ciphers:     all   HTTPS certificate name: default-cert   Listen enabled:        yes   No Listen Interfaces.    Inactivity timeout:    1 hr   Session timeout:       2 hr 30 min   Session renewal:       30 min  Web file transfer proxy:   Proxy enabled: no  Web file transfer certificate authority:   HTTPS server cert verify: yes   HTTPS supplemental CA list: default-ca-list switch (config) #           </pre> |                                                                                                                                                                                  |

---

|                         |                        |
|-------------------------|------------------------|
| <b>Related Commands</b> | show web<br>web enable |
|-------------------------|------------------------|

---

|             |                                                                 |
|-------------|-----------------------------------------------------------------|
| <b>Note</b> | Enabling HTTP is meaningful if the WebUI as a whole is enabled. |
|-------------|-----------------------------------------------------------------|

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## web httpd

**web httpd listen {enable | interface <ifName> }**  
**no web httpd listen {enable | interface <ifName> }**

Enables the listen interface restricted list for HTTP and HTTPS.  
 The no form of the command disables the HTTP server listen ability.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                          |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Enables Web interface restrictions on access to this system.             |
|                           | interface <ifName>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Adds interface to Web server access restriction list (i.e. mgmt0, mgmt1) |
| <b>Default</b>            | Listening is enabled.<br>all interfaces are permitted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                          |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Updated Example                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                          |
| <b>Example</b>            | <pre>switch (config) # web httpd listen enable switch (config) # show web  Web User Interface: Web interface enabled:  yes HTTP enabled:         yes HTTP port:            80 HTTP redirect to HTTPS: no HTTPS enabled:        yes HTTPS port:           443 HTTPS ssl-ciphers:    all HTTPS certificate name: default-cert Listen enabled:       yes No Listen Interfaces.  Inactivity timeout:    1 hr Session timeout:      2 hr 30 min Session renewal:      30 min  Web file transfer proxy: Proxy enabled: no  Web file transfer certificate authority: HTTPS server cert verify: yes HTTPS supplemental CA list: default-ca-list switch (config) #</pre> |                                                                          |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                          |
| <b>Note</b>               | If enabled, and if at least one of the interfaces listed is eligible to be a listen interface, then HTTP/HTTPS requests will only be accepted on those interfaces. Otherwise, HTTP/HTTPS requests are accepted on any interface.                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |

## web https

**web https {certificate {regenerate | name | default-cert} | enable | port <port number> | ssl ciphers {all | TLS | TLS1.2}}**  
**no web https {enable | port <port number>}**

Configures HTTPS access to the web-based management console.  
 The no form of the command negates HTTPS settings for the web-based management console.

|                           |                                         |                                                                  |
|---------------------------|-----------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | certificate regenerate                  | Re-generates certificate to use for HTTPS connections.           |
|                           | certificate name                        | Configure the named certificate to be used for HTTPS connections |
|                           | certificate default-cert                | Configure HTTPS to use the configured default certificate        |
|                           | enable                                  | Enables HTTPS access to the web-based management console.        |
|                           | port                                    | Sets a TCP port for HTTPS access.                                |
|                           | ssl ciphers {all   TLS   TLS1.2}        | Sets ciphers to be used for HTTPS.                               |
| <b>Default</b>            | HTTPS is enabled<br>Default port is 443 |                                                                  |
| <b>Configuration Mode</b> | Config                                  |                                                                  |
| <b>History</b>            | 3.1.0000                                |                                                                  |
|                           | 3.4.0000                                | Added “ssl ciphers” parameter                                    |
|                           | 3.4.0010                                | Added TLS parameter to “ssl ciphers”                             |
| <b>Role</b>               | admin                                   |                                                                  |

---

**Example**

```
switch (config) # web https enable
switch (config) # show web

Web User Interface:
 Web interface enabled: yes
 HTTP enabled: yes
 HTTP port: 80
 HTTP redirect to HTTPS: no
 HTTPS enabled: yes
 HTTPS port: 443
 HTTPS ssl-ciphers: all
 HTTPS certificate name: default-cert
 Listen enabled: yes
 No Listen Interfaces.

 Inactivity timeout: 1 hr
 Session timeout: 2 hr 30 min
 Session renewal: 30 min

Web file transfer proxy:
 Proxy enabled: no

Web file transfer certificate authority:
 HTTPS server cert verify: yes
 HTTPS supplemental CA list: default-ca-list
switch (config) #
```

---

**Related Commands**

```
show web
web enable
```

---

**Note**

- Enabling HTTPS is meaningful if the WebUI as a whole is enabled.
  - See the command “crypto certificate default-cert name” for how to change the default certificate if inheriting the configured default certificate is preferred
-

## web session

**web session {renewal <minutes> | timeout <minutes>}**  
**no web session {renewal | timeout}**

Configures session settings.  
 The no form of the command resets session settings to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | renewal <minutes>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Configures time before expiration to renew a session. |
|                           | timeout <minutes>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Configures time after which a session expires.        |
| <b>Default</b>            | timeout - 2.5 hours<br>renewal - 30 min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                       |
| <b>Example</b>            | <pre>switch (config) # web session renewal 60 switch (config) # show web  Web User Interface: Web interface enabled:  yes HTTP enabled:         yes HTTP port:            80 HTTP redirect to HTTPS: no HTTPS enabled:        yes HTTPS port:           443 HTTPS ssl-ciphers:    all HTTPS certificate name: default-cert Listen enabled:       yes No Listen Interfaces.  Inactivity timeout:    1 hr Session timeout:      2 hr 30 min Session renewal:      60 min  Web file transfer proxy: Proxy enabled: no  Web file transfer certificate authority: HTTPS server cert verify: yes HTTPS supplemental CA list: default-ca-list switch (config) #</pre> |                                                       |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |

## web proxy auth

**web proxy auth {authtype <type>| basic [password <password> | username <username>]}**

**no web proxy auth {authtype | basic {password | username } }**

Configures authentication settings for web proxy authentication.  
The no form of the command resets the attributes to their default values.

|                           |                        |                                                                                                                                                                                                                    |
|---------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                   | Configures the type of authentication to use with web proxy.<br>The possible values are: <ul style="list-style-type: none"> <li>• basic - HTTP basic authentication</li> <li>• none - No authentication</li> </ul> |
|                           | basic                  | Configures HTTP basic authentication settings for proxy. The password is accepted and stored in plaintext.                                                                                                         |
|                           | password               | A password used for HTTP basic authentication with the web proxy.                                                                                                                                                  |
|                           | username               | A username used for HTTP basic authentication with the web proxy.                                                                                                                                                  |
| <b>Default</b>            | Web proxy is disabled. |                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config                 |                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000               |                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                  |                                                                                                                                                                                                                    |

---

**Example**

```
switch (config) # web proxy auth authtype basic
switch (config) # web proxy auth basic username web-user
switch (config) # web proxy auth basic password web-password
switch (config) # show web
```

**Web User Interface:**

```
Web interface enabled: yes
HTTP enabled: yes
HTTP port: 80
HTTP redirect to HTTPS: no
HTTPS enabled: yes
HTTPS port: 443
HTTPS ssl-ciphers: all
HTTPS certificate name: default-cert
Listen enabled: yes
No Listen Interfaces.
```

```
Inactivity timeout: 1 hr
Session timeout: 2 hr 30 min
Session renewal: 30 min
```

**Web file transfer proxy:**

```
Proxy enabled: yes
Proxy address: 10.10.10.11
Proxy port: 40
Authentication type: basic
Basic auth username: web-user
Basic auth password: web-password
```

**Web file transfer certificate authority:**

```
HTTPS server cert verify: yes
HTTPS supplemental CA list: default-ca-list
```

```
switch (config) #
```

---

**Related Commands**

```
show web
web proxy host
```

---

**Note**

---



## web proxy host

**web proxy host** <IP address> [port <port number>]

**no web proxy**

Adds and enables a proxy to be used for any HTTP or FTP downloads.  
The no form of the command disables the web proxy.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | IPv4 or IPv6 address.            |
|                           | port number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sets the web proxy default port. |
| <b>Default</b>            | 1080                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
| <b>Example</b>            | <pre>switch (config) # web proxy host 10.10.10.10 port 1080 switch (config) # show web</pre> <p>Web User Interface:</p> <pre>Web interface enabled: yes HTTP enabled: yes HTTP port: 80 HTTP redirect to HTTPS: no HTTPS enabled: yes HTTPS port: 443 HTTPS ssl-ciphers: all HTTPS certificate name: default-cert Listen enabled: yes No Listen Interfaces.</pre> <pre>Inactivity timeout: 1 hr Session timeout: 2 hr 30 min Session renewal: 30 min</pre> <p>Web file transfer proxy:</p> <pre>Proxy enabled: yes Proxy address: 10.10.10.10 Proxy port: 1080 Authentication type: basic Basic auth username: web-user Basic auth password: web-password</pre> <p>Web file transfer certificate authority:</p> <pre>HTTPS server cert verify: yes HTTPS supplemental CA list: default-ca-list switch (config) #</pre> |                                  |
| <b>Related Commands</b>   | web proxy auth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |

## show web

### show web

Displays the web configuration.

| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                    | 3.4.0000 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                    | 3.4.1100 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Example            | <pre>switch (config) # show web  Web User Interface: Web interface enabled:  yes Web caching enabled:   yes HTTP enabled:         yes HTTP port:            80 HTTP redirect to HTTPS: no HTTPS enabled:        yes HTTPS port:           443 HTTPS ssl-ciphers:    all HTTPS certificate name: default-cert Listen enabled:       yes No Listen Interfaces.  Inactivity timeout:    1 hr Session timeout:      2 hr 30 min Session renewal:       30 min  Web file transfer proxy: Proxy enabled: yes Proxy address:        10.10.10.11 Proxy port:           40 Authentication type:  basic Basic auth username:  web-user Basic auth password:  web-password  Web file transfer certificate authority: HTTPS server cert verify: yes HTTPS supplemental CA list: default-ca-list switch (config) #</pre> |
| Related Commands   | <pre>show web web proxy auth</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## 4 System Management

### 4.1 Management Interface

#### 4.1.1 Configuring Management Interfaces with Static IP Addresses

If your switch system was set during initialization to obtain dynamic IP addresses through DHCP and you wish to switch to static assignments, perform the following steps:

**Step 1.** Enter Config mode. Run:

```
switch >
switch > enable
switch # configure terminal
switch (config) #
```

**Step 2.** Disable setting IP addresses using the DHCP using the following command:

```
switch (config) # no interface <ifname> dhcp
```

**Step 3.** Define your interfaces statically using the following command:

```
switch (config) # interface <ifname> ip address <IP address> <netmask>
```

#### 4.1.2 Configuring IPv6 Address on the Management Interface

**Step 1.** Enable IPv6 on this interface.

```
switch (config) # interface mgmt0 ipv6 enable
```

**Step 2.** Set the IPv6 address to be configured automatically.

```
switch (config) # interface mgmt0 ipv6 address autoconfig
```

**Step 3.** Verify the IPv6 address is configured correctly.

```
switch (config) # show interfaces mgmt0 brief
```

#### 4.1.3 Dynamic Host Configuration Protocol (DHCP)

DHCP is used for automatic retrieval of management IP addresses.

For all other systems (and software versions) DHCP is disabled by default.



If a user connects through SSH, runs the wizard and turns off DHCP, the connection is immediately terminated as the management interface loses its IP address.

```
<localhost># ssh admin@<ip-address>
Mellanox MLNX-OS Switch Management
Password:
Mellanox Switch
Mellanox configuration wizard
Do you want to use the wizard for initial configuration? yes
Step 1: Hostname? [my-switch]
Step 2: Use DHCP on mgmt0 interface? [yes] no
<localhost>#
```

In such case the serial connection should be used.

### 4.1.4 Default Gateway

To configure manually the default gateway, use the “ip route” command, with “0.0.0.0” as prefix and mask. The next-hop address must be within the range of one of the IP interfaces on the system.

```
switch (config)# ip route 0.0.0.0 0.0.0.0 10.209.0.2
switch (config)# show ip route
```

| Destination | Mask          | Gateway    | Interface | Source |
|-------------|---------------|------------|-----------|--------|
| default     | 0.0.0.0       | 10.209.0.2 | mgmt0     | static |
| 10.209.0.0  | 255.255.254.0 | 0.0.0.0    | mgmt0     | direct |

```
switch (config)#
```

### 4.1.5 In-Band Management

In-band management is a management path passing through the data ports. In-band management can be created over one of the VLANs in the systems.

The in-band management feature does not require any license. However, it works only for system profiles VPI and Ethernet. It cannot be enabled with IP Routing or IP Proxy-ARP.

➤ **To set an in-band management channel:**

**Step 1.** Create a VLAN. Run:

```
switch (config) # vlan 10
switch (config vlan 10) #
```

**Step 2.** Create a VLAN interface. Run:

```
switch (config) # interface vlan 10 create
```

**Step 3.** Enter the VLAN interface configuration mode and configure L3 attributes. Run:

```
switch (config) # interface vlan10
switch (config interface vlan10)#ip address 10.10.10.10 /24
```

**Step 4.** (Optional) Verify in-band management configuration. Run:

```
switch (config) # show interfaces vlan10
Interface vlan10 status:
 Comment:
 Admin up: yes
 Link up: yes
 DHCP running: no
 IP address: 10.10.10.10
 Netmask: 255.255.255.0
 IPv6 enabled: no
```

```
Speed: N/A
Duplex: N/A
Interface type: ethernet
Interface source: vlan
MTU: 1500
HW address: 00:02:C9:7E:24:E8

RX bytes: 0 TX bytes: 250
RX packets: 0 TX packets: 3
RX mcast packets: 0 TX discards: 0
RX discards: 0 TX errors: 0
RX errors: 0 TX overruns: 0
RX overruns: 0 TX carrier: 0
RX frame: 0 TX collisions: 0
 TX queue len: 0

switch (config) #
```

## 4.1.6 Commands

### 4.1.6.1 Interface

This chapter describes the commands should be used to configure and monitor the management interface.

#### interface

**interface {mgmt0 | mgmt1 | lo | vlan<id> | ib0}**

Enters a management interface context.

|                           |                                                                                |                                                                         |
|---------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Syntax Description</b> | mgmt0                                                                          | Management port 0 (out of band).                                        |
|                           | mgmt1                                                                          | Management port 1 (out of band).                                        |
|                           | lo                                                                             | Loopback interface.                                                     |
|                           | vlan<id>                                                                       | In-band management interface (e.g. vlan10).                             |
|                           | ib0                                                                            | IPoIB in-band management, relevant only for Infini-Band switch systems. |
| <b>Default</b>            | N/A                                                                            |                                                                         |
| <b>Configuration Mode</b> | Config                                                                         |                                                                         |
| <b>History</b>            | 3.1.0000                                                                       |                                                                         |
| <b>Role</b>               | admin                                                                          |                                                                         |
| <b>Example</b>            | <pre>switch (config) # interface mgmt0 switch (config interface mgmt0) #</pre> |                                                                         |
| <b>Related Commands</b>   | show interfaces <ifname>                                                       |                                                                         |
| <b>Note</b>               |                                                                                |                                                                         |

## interface vlan create

**interface vlan <id> create**  
**no interface vlan <id> create**

Creates an in-band management interface.  
 The no form of the command deletes the in-band management interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | id<br>VLAN ID. Range is 1-4094.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | switch (config) # interface vlan 10 create<br>switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Commands</b>   | interface<br>show interfaces <ifname>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This command does not requires any license</li> <li>• If IP Proxy-ARP or IP Routing is enabled, the interface cannot be created</li> <li>• No more than 60 in-band management interfaces can be created</li> <li>• All management interface commands are applicable under this interface (ip address, mtu, dhcp, shutdown, zeroconf ...)</li> <li>• To enter the interface VLAN configuration mode you need to use the command “interface vlan&lt;id&gt;” (e.g. interface vlan10)</li> </ul> |

## ip address

**ip address** <IP address> <netmask>

**no ip address**

Sets the IP address and netmask of this interface.

The no form of the command clears the IP address and netmask of this interface.

| Syntax Description        | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IPv4 address              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                           | netmask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Subnet mask of IP address |
| <b>Default</b>            | 0.0.0.0/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |
| <b>Configuration Mode</b> | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                           |
| <b>Example</b>            | <pre> switch (config) # interface mgmt0 switch (config interface mgmt0) # ip address 10.10.10.10 255.255.255.0 switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        10.10.10.10   Netmask:           255.255.255.0   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80:202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:     ethernet   Interface ifindex:  2   Interface source:   physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:    RX bytes:          2946769856      TX bytes:          467577486   RX packets:        44866091       TX packets:        1385520   RX mcast packets:  0              TX discards:       0   RX discards:       0              TX errors:         0   RX errors:         0              TX overruns:       0   RX overruns:       0              TX carrier:        0   RX frame:          0              TX collisions:     0                                    TX queue len:    1000  switch (config interface mgmt0) # </pre> |                           |
| <b>Related Commands</b>   | show interfaces <ifname>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |
| <b>Note</b>               | If DHCP is enabled on the specified interface, then the DHCP IP assignment will hold until DHCP is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |



## ip default-gateway

**ip default-gateway <next hop IP address or interface name>**  
**no ip default-gateway**

Configures a default route.  
 The no form of the command removes the current default route.

|                           |                                                                 |                                  |
|---------------------------|-----------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | next hop IP address or interface name                           | IP address, lo, mgmt0, or mgmt1. |
| <b>Default</b>            | N/A                                                             |                                  |
| <b>Configuration Mode</b> | Config Interface Management                                     |                                  |
| <b>History</b>            | 3.1.0000                                                        |                                  |
| <b>Role</b>               | admin                                                           |                                  |
| <b>Example</b>            | switch (config) # ip default-gateway mgmt1<br>switch (config) # |                                  |
| <b>Related Commands</b>   |                                                                 |                                  |
| <b>Note</b>               |                                                                 |                                  |

## alias

**alias <index> ip address < IP address> <netmask>**  
**no alias <index>**

Adds an additional IP address to the specified interface. The secondary address will appear in the output of “show interface” under the data of the primary interface along with the alias.

The no form of the command removes the secondary address to the specified interface.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                       |  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--|
| Syntax Description | index                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | A number that is to be aliased to (associated with) the secondary IP. |  |
|                    | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Additional IP address.                                                |  |
|                    | netmask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Subnet mask of the IP address.                                        |  |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                       |  |
| Configuration Mode | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                       |  |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                       |  |
| Example            | <pre>switch (config interface mgmt0) # alias 2 ip address 9.9.9.9 255.255.255.255 switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        172.30.2.2   Netmask:           255.255.0.0   Secondary address: 9.9.9.9/32 (alias: 'mgmt0:2')   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80::202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:    ethernet   Interface ifindex: 2   Interface source:  physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:    RX bytes:          2970074221      TX bytes:          468579522   RX packets:        44983023       TX packets:        1390539   RX mcast packets:  0              TX discards:       0   RX discards:       0              TX errors:         0   RX errors:         0              TX overruns:       0   RX overruns:       0              TX carrier:        0   RX frame:          0              TX collisions:     0                                    TX queue len:    1000  switch (config interface mgmt0) #</pre> |                                                                       |  |

---

**Related Commands**

---

show interfaces &lt;ifname&gt;

**Note**

- If DHCP is enabled on the specified interface, then the DHCP IP assignment will hold until DHCP is disabled
  - More than one additional IP address can be added to the interface
-

## mtu

**mtu <bytes>**  
**no mtu <bytes>**

Sets the Maximum Transmission Unit (MTU) of this interface.  
 The no form of the command resets the MTU to its default.

| Syntax Description | bytes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The entry range is 68-1500. |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Default            | 1500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
| Configuration Mode | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |
| Example            | <pre> switch (config interface mgmt0) # mtu 1500 switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        172.30.2.2   Netmask:           255.255.0.0   Secondary address: 9.9.9.9/32 (alias: 'mgmt0:2')   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80:202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:    ethernet   Interface ifindex: 2   Interface source:  physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:    RX bytes:          2970074221      TX bytes:          468579522   RX packets:        44983023       TX packets:        1390539   RX mcast packets:  0              TX discards:       0   RX discards:       0              TX errors:         0   RX errors:         0              TX overruns:       0   RX overruns:       0              TX carrier:        0   RX frame:          0              TX collisions:     0                                       TX queue len:      1000  switch (config interface mgmt0) # </pre> |                             |
| Related Commands   | show interfaces <ifname>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |

## duplex

**duplex <duplex>**

**no duplex**

Sets the interface duplex.

The no form of the command resets the duplex setting for this interface to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | duplex                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sets the duplex mode of the interface. The following are the possible values: <ul style="list-style-type: none"> <li>• half - half duplex</li> <li>• full - full duplex</li> <li>• auto - auto duplex sensing (half or full)</li> </ul> |
| <b>Default</b>            | auto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre> switch (config interface mgmt0) # duplex auto switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        172.30.2.2   Netmask:           255.255.0.0   Secondary address: 9.9.9.9/32 (alias: 'mgmt0:2')   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80::202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:    ethernet   Interface ifindex: 2   Interface source:  physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:   RX bytes:          2970074221   RX packets:        44983023   RX mcast packets:  0   RX discards:       0   RX errors:         0   RX overruns:       0   RX frame:          0   TX bytes:          468579522   TX packets:        1390539   TX discards:       0   TX errors:         0   TX overruns:       0   TX carrier:        0   TX collisions:     0   TX queue len:      1000  switch (config interface mgmt0) # </pre> |                                                                                                                                                                                                                                         |

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|                         |                          |
|-------------------------|--------------------------|
| <b>Related Commands</b> | show interfaces <ifname> |
|-------------------------|--------------------------|

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- |             |                                                                                                                                                                                                                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | <ul style="list-style-type: none"><li>• Setting the duplex to “auto” also sets the speed to “auto”</li><li>• Setting the duplex to one of the settings “half” or “full” also sets the speed to a manual setting which is determined by querying the interface to find out its current auto-detected state</li></ul> |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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## speed

**speed <speed>**  
**no speed**

Sets the interface speed.  
 The no form of the command resets the speed setting for this interface to its default value.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                           |  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Syntax Description | speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Sets the speed of the interface. The following are the possible values: <ul style="list-style-type: none"><li>• 10 - fixed to 10Mbps</li><li>• 100 - fixed to 1000Mbps</li><li>• 1000 - fixed to 1000Mbps</li><li>• auto - auto speed sensing (10/100/1000Mbps)</li></ul> |  |
| Default            | auto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                           |  |
| Configuration Mode | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                           |  |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                           |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                           |  |
| Example            | <pre>switch (config interface mgmt0) # speed auto switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        172.30.2.2   Netmask:           255.255.0.0   Secondary address: 9.9.9.9/32 (alias: 'mgmt0:2')   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80::202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:    ethernet   Interface ifindex: 2   Interface source:  physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:    RX bytes:          2970074221      TX bytes:          468579522   RX packets:        44983023       TX packets:        1390539   RX mcast packets:  0              TX discards:       0   RX discards:       0              TX errors:         0   RX errors:         0              TX overruns:       0   RX overruns:       0              TX carrier:        0   RX frame:          0              TX collisions:     0                                       TX queue len:      1000  switch (config interface mgmt0) #</pre> |                                                                                                                                                                                                                                                                           |  |

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|                         |                          |
|-------------------------|--------------------------|
| <b>Related Commands</b> | show interfaces <ifname> |
|-------------------------|--------------------------|

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**Note**

- Setting the speed to “auto” also sets the duplex to “auto”
  - Setting the speed to one of the manual settings (generally “10”, “100”, or “1000”) also sets the duplex to a manual setting which is determined by querying the interface to find out its current auto-detected state
- 
-



## dhcp

### dhcp [renew]

### no dhcp

Enables DHCP on the specified interface.

The no form of the command disables DHCP on the specified interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | renew                                                                                                                                                                                                                                                                                                                                                                                                                                         | Forces a renewal of the IP address. A restart on the DHCP client for the specified interface will be issued. |
| <b>Default</b>            | Could be enabled or disabled (per part number) manufactured with 3.2.0500                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                              |
| <b>Configuration Mode</b> | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                              |
| <b>Example</b>            | <pre>switch (config interface mgmt0) # dhcp switch (config) # show interfaces mgmt0 configured Interface mgmt0 configuration   Enabled:          yes   DHCP:             yes   Zeroconf:         no   IP address:   Netmask:   IPv6 enabled:     yes   Autoconf enabled: no   Autoconf route:   yes   Autoconf privacy: no   IPv6 addresses:   0   Speed:            auto   Duplex:            auto   MTU:              1500   Comment:</pre> |                                                                                                              |
| <b>Related Commands</b>   | show interfaces <ifname> configured                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When enabling DHCP, the IP address and netmask are received via DHCP hence, the static IP address configuration is ignored</li> <li>Enabling DHCP disables zeroconf and vice versa</li> <li>Setting a static IP address and netmask does not disable DHCP. DHCP is disabled by using the “no” form of this command, or by enabling zeroconf.</li> </ul>                                                |                                                                                                              |

## shutdown

**shutdown**  
**no shutdown**

Disables the specified interface.  
 The no form of the command enables the specified interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | no shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config interface mgmt0) # no shutdown switch (config) # show interfaces mgmt0 configured Interface mgmt0 configuration   Enabled:          yes   DHCP:            yes   Zeroconf:        no   IP address:   Netmask:   IPv6 enabled:    yes   Autoconf enabled: no   Autoconf route:  yes   Autoconf privacy: no   IPv6 addresses:  0   Speed:          auto   Duplex:         auto   MTU:            1500   Comment: switch (config) #</pre> |
| <b>Related Commands</b>   | show interfaces <ifname> configured                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## zeroconf

**zeroconf**  
**no zeroconf**

Enables zeroconf on the specified interface. It randomly chooses a unique link-local IPv4 address from the 169.254.0.0/16 block. This command is an alternative to DHCP.

The no form of the command disables the use of zeroconf on the specified interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Default</b>            | no zeroconf                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config interface mgmt0) # zeroconf switch (config) # show interfaces mgmt0 configured Interface mgmt0 configuration   Enabled:          yes   DHCP:            no   Zeroconf:         yes   IP address:   Netmask:   IPv6 enabled:     yes   Autoconf enabled: no   Autoconf route:   yes   Autoconf privacy: no   IPv6 addresses:   0   Speed:            auto   Duplex:           auto   MTU:              1500   Comment:</pre> |
| <b>Related Commands</b>   | show interfaces <ifname> configured                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Note</b>               | Enabling zeroconf disables DHCP and vice versa.                                                                                                                                                                                                                                                                                                                                                                                                 |

## comment

**comment** <comment>

**no comment**

Adds a comment for an interface.

The no form of the command removes a comment for an interface.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|
| Syntax Description | comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | A free-form string that has no semantics other than being displayed when the interface records are listed. |  |
| Default            | no comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                            |  |
| Configuration Mode | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                            |  |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                            |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                            |  |
| Example            | <pre>switch (config interface mgmt0) # comment my-interface switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        172.30.2.2   Netmask:           255.255.0.0   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80::202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:    ethernet   Interface ifindex: 2   Interface source:  physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:           my-interface    RX bytes:          962067812      TX bytes:          40658219   RX packets:        3738865       TX packets:        142345   RX mcast packets:  0             TX discards:       0   RX discards:       0             TX errors:         0   RX errors:         0             TX overruns:       0   RX overruns:       0             TX carrier:        0   RX frame:          0             TX collisions:     0                                    TX queue len:    1000  switch (config interface mgmt0) #</pre> |                                                                                                            |  |
| Related Commands   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                            |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                            |  |

## ipv6 enable

**ipv6 enable**  
**no ipv6 enable**

Enables all IPv6 addressing for this interface.  
 The no form of the command disables all IPv6 addressing for this interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | IPv6 addressing is disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre> switch (config interface mgmt0) # ipv6 enable switch (config interface mgmt0) # show interfaces mgmt0 Interface mgmt0 state   Admin up:          yes   Link up:           yes   IP address:        172.30.2.2   Netmask:           255.255.0.0   IPv6 enabled:      yes   Autoconf enabled:  no   Autoconf route:    yes   Autoconf privacy:  no   IPv6 addresses:    1   IPv6 address:      fe80::202:c9ff:fe5e:a5d8/64   Speed:             1000Mb/s (auto)   Duplex:            full (auto)   Interface type:    ethernet   Interface ifindex: 2   Interface source:  physical   MTU:               1500   HW address:        00:02:C9:5E:A5:D8   Comment:           my-interface    RX bytes:          962067812      TX bytes:          40658219   RX packets:        3738865       TX packets:        142345   RX mcast packets:  0             TX discards:       0   RX discards:       0             TX errors:         0   RX errors:         0             TX overruns:       0   RX overruns:       0             TX carrier:        0   RX frame:          0             TX collisions:     0                                    TX queue len:    1000  switch (config interface mgmt0) # </pre> |

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**Related Commands**

ipv6 address  
show interface <ifname>

---

**Note**

- The interface identifier is a 64-bit long modified EUI-64, which is based on the MAC address of the interface
  - If IPv6 is enabled on an interface, the system will automatically add a link-local address to the interface. Link-local addresses can only be used to communicate with other hosts on the same link, and packets with link-local addresses are never forwarded by a router.
  - A link-local address, which may not be removed, is required for proper IPv6 operation. The link-local addresses start with “fe80::”, and are combined with the interface identifier to form the complete address.
- 
-

## ipv6 address

**ipv6 address** {<IPv6 address/netmask> | **autoconfig** [**default** | **privacy**]}  
**no ipv6** {<IPv6 address/netmask> | **autoconfig** [**default** | **privacy**]}

Configures IPv6 address and netmask to this interface, static or autoconfig options are possible.

The no form of the command removes the given IPv6 address and netmask or disables the autoconfig options.

|                           |                                                 |                                                                                                                                                                                                                                          |
|---------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | IPv6 address/netmask                            | Configures a static IPv6 address and netmask.<br>Format example: 2001:db8:1234::5678/64.                                                                                                                                                 |
|                           | autoconfig                                      | Enables IPv6 stateless address auto configuration (SLAAC) for this interface. An address will be automatically added to the interface based on an IPv6 prefix learned from router advertisements, combined with an interface identifier. |
|                           | autoconfig default                              | Enables default learning routes. The default route will be discovered automatically, if the autoconfig is enabled.                                                                                                                       |
|                           | autoconfig privacy                              | Uses privacy extensions for SLAAC to construct the autoconfig address, if the autoconfig is enabled.                                                                                                                                     |
| <b>Default</b>            | No IP address available, auto config is enabled |                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config Interface Management                     |                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                        |                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                           |                                                                                                                                                                                                                                          |

**Example**

```

switch (config interface mgmt0) # ipv6 fe80::202:c9ff:fe5e:a5d8/64
switch (config interface mgmt0) # show interfaces mgmt0
Interface mgmt0 state
 Admin up: yes
 Link up: yes
 IP address: 172.30.2.2
 Netmask: 255.255.0.0
 IPv6 enabled: yes
 Autoconf enabled: no
 Autoconf route: yes
 Autoconf privacy: no
 IPv6 addresses: 1
 IPv6 address: fe80::202:c9ff:fe5e:a5d8/64
 Speed: 1000Mb/s (auto)
 Duplex: full (auto)
 Interface type: ethernet
 Interface ifindex: 2
 Interface source: physical
 MTU: 1500
 HW address: 00:02:C9:5E:A5:D8
 Comment: my-interface

 RX bytes: 962067812 TX bytes: 40658219
 RX packets: 3738865 TX packets: 142345
 RX mcast packets: 0 TX discards: 0
 RX discards: 0 TX errors: 0
 RX errors: 0 TX overruns: 0
 RX overruns: 0 TX carrier: 0
 RX frame: 0 TX collisions: 0
 TX queue len: 1000

switch (config interface mgmt0) #

```

**Related Commands**

```

ipv6 enable
show interface <ifname>

```

**Note**

- Unlike IPv4, IPv6 can have multiple IPv6 addresses on a given interface
- For Ethernet, the default interface identifier is a 64-bit long modified EUI-64, which is based on the MAC address of the interface



## ipv6 dhcp

**ipv6 dhcp {primary-intf <if-name> | stateless}**  
**no ipv6 dhcp {primary-intf | stateless}**

Configures global DHCPv6 settings.  
 The no form of the command resets certain global DHCPv6 settings.

|                           |                                                                             |                                                                                                          |
|---------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | if-name                                                                     | Interface name: <ul style="list-style-type: none"> <li>• lo</li> <li>• mgmt0</li> <li>• mgmt1</li> </ul> |
| <b>Default</b>            | N/A                                                                         |                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                      |                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                    |                                                                                                          |
| <b>Role</b>               | admin                                                                       |                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # ipv6 dhcp primary-intf mgmt0 switch (config) #</pre> |                                                                                                          |
| <b>Related Commands</b>   | ipv6 enable<br>ipv6 address<br>show interface <ifname>                      |                                                                                                          |
| <b>Note</b>               |                                                                             |                                                                                                          |

## ipv6 dhcp client

**ipv6 dhcp client enable**  
**no ipv6 dhcp {primary-intf | stateless}**

Configures global DHCPv6 settings.  
 The no form of the command resets certain global DHCPv6 settings.

|                           |                                                                             |                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | if-name                                                                     | Interface name:<br><ul style="list-style-type: none"> <li>• lo</li> <li>• mgmt0</li> <li>• mgmt1</li> </ul> |
| <b>Default</b>            | N/A                                                                         |                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                      |                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                    |                                                                                                             |
| <b>Role</b>               | admin                                                                       |                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # ipv6 dhcp primary-intf mgmt0 switch (config) #</pre> |                                                                                                             |
| <b>Related Commands</b>   | <pre>ipv6 enable ipv6 address show interface &lt;ifname&gt;</pre>           |                                                                                                             |
| <b>Note</b>               |                                                                             |                                                                                                             |

## show interface

**show interface {<ifname> [configured | brief]}**

Displays information about the specified interface, configuration status, and counters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | ifname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The interface name e.g., “mgmt0”, “mgmt1”, “lo” (loopback), etc. |
|                           | configured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Displays the interface configuration.                            |
|                           | brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Displays a brief info on the interface configuration and status. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                  |
| <b>Example</b>            | <pre> switch (config) #show interfaces mgmt0 configured Interface mgmt0 configuration   Enabled:          yes   DHCP:            yes   Zeroconf:        no   IP address:   Netmask:   IPv6 enabled:    yes   Autoconf enabled: no   Autoconf route:  yes   Autoconf privacy: no   IPv6 addresses:  0   Speed:          auto   Duplex:         auto   MTU:            1500   Comment:        my-interface switch (config) # show interfaces mgmt0 brief Interface mgmt0 state   Admin up:        yes   Link up:         yes   IP address:      172.30.2.2   Netmask:         255.255.0.0   IPv6 enabled:    yes   Autoconf enabled: no   Autoconf route:  yes   Autoconf privacy: no   IPv6 addresses:  1   IPv6 address:    fe80::202:c9ff:fe5e:a5d8/64   Speed:           1000Mb/s (auto)   Duplex:          full (auto)   Interface type:  ethernet   Interface ifindex: 2   Interface source: physical   MTU:            1500   HW address:      00:02:C9:5E:A5:D8   Comment:        my-interface switch (config) # </pre> |                                                                  |

|                         |     |
|-------------------------|-----|
| <b>Related Commands</b> | N/A |
|-------------------------|-----|

|             |
|-------------|
| <b>Note</b> |
|-------------|

## 4.1.6.2 Hostname Resolution

### hostname

**hostname <hostname>**  
**no hostname**

Sets a static system hostname.  
 The no form of the command clears the system hostname.

|                           |                                                                                                                                                                                                                                                                                                                                                                           |                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | hostname                                                                                                                                                                                                                                                                                                                                                                  | A free-form string. |
| <b>Default</b>            | Default hostname                                                                                                                                                                                                                                                                                                                                                          |                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                    |                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                  |                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                     |                     |
| <b>Example</b>            | <pre>switch (config) # hostname my-switch-hostname my-switch-hostname (config) #</pre>                                                                                                                                                                                                                                                                                    |                     |
| <b>Related Commands</b>   | show hosts                                                                                                                                                                                                                                                                                                                                                                |                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Hostname may contain letters, numbers, and hyphens ('-'), in any combination</li> <li>• Hostname may not contain other letters, such as '%', '_', '.' etc</li> <li>• Hostname may not begin with a hyphen</li> <li>• Hostname may be 1-63 characters long</li> <li>• Changing hostname stamps a new HTTPS certificate</li> </ul> |                     |

## ip name-server

**ip name-server** <IPv4/IPv6 address>

**no name-server** <IPv4/IPv6 address>

Sets the static name server.

The no form of the command clears the name server.

| Syntax Description | IPv4/v6 address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IPv4 or IPv6 address. |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Default            | No server name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
| Example            | <pre>switch (config) # ip name-server 9.9.9.9 switch (config) # show hosts Hostname: switch Name server: 9.9.9.9 (configured) Name server: 10.211.0.121 (dynamic) Name server: 172.30.0.126 (dynamic) Name server: 10.4.0.135 (dynamic) Domain name: lab.mtl.com (dynamic) Domain name: vmlab.mtl.com (dynamic) Domain name: yok.mtl.com (dynamic) Domain name: mtl.com (dynamic) IP 127.0.0.1 maps to hostname localhost IPv6 ::1 maps to hostname localhost6 Automatically map hostname to loopback address: yes Automatically map hostname to IPv6 loopback address: no switch (config) #</pre> |                       |
| Related Commands   | show hosts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |

## ip domain-list

**ip domain-list <domain-name>**  
**no ip domain-list <domain-name>**

Sets the static domain name.  
 The no form of the command clears the domain name.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                             |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | domain-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The domain name in a string form.<br>A domain name is an identification string that defines a realm of administrative autonomy, authority, or control in the Internet. Domain names are formed by the rules and procedures of the Domain Name System (DNS). |
| <b>Default</b>            | No static domain name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # ip domain-list mydomain.com switch (config) # show hosts Hostname: switch Name server: 10.211.0.121 (dynamic) Name server: 172.30.0.126 (dynamic) Name server: 10.4.0.135 (dynamic) Domain name: mydomain.com (configured) Domain name: lab.mtl.com (dynamic) Domain name: vmlab.mtl.com (dynamic) Domain name: yok.mtl.com (dynamic) Domain name: mtl.com (dynamic) IP 1.1.1.1 maps to hostname p IP 127.0.0.1 maps to hostname localhost IPv6 ::1 maps to hostname localhost6 Automatically map hostname to loopback address: yes Automatically map hostname to IPv6 loopback address: no switch (config) #</pre> |                                                                                                                                                                                                                                                             |
| <b>Related Commands</b>   | show hosts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                             |

## ip/ipv6 host

**{ip | ipv6} host <hostname> <IP Address>**  
**no {ip | ipv6} host <hostname> <IP Address>**

Configures the static hostname IPv4 or IPv6 address mappings.  
 The no form of the command clears the static mapping.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | hostname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The hostname in a string form. |
|                           | IP Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The IPv4 or IPv6 address.      |
| <b>Default</b>            | No static domain name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                |
| <b>Example</b>            | <pre>switch (config) # ip host my-host 2.2.2.2 switch (config) # ipv6 host my-ipv6-host 2001::8f9 switch (config) # show hosts Hostname: switch Name server: 9.9.9.9 (configured) Name server: 10.211.0.121 (dynamic) Name server: 172.30.0.126 (dynamic) Name server: 10.4.0.135 (dynamic) Domain name: mydomain.com (configured) Domain name: lab.mtl.com (dynamic) Domain name: vmlab.mtl.com (dynamic) Domain name: yok.mtl.com (dynamic) Domain name: mtl.com (dynamic) IP 1.1.1.1 maps to hostname p IP 127.0.0.1 maps to hostname localhost IP 2.2.2.2 maps to hostname my-host IPv6 2001::8f9 maps to hostname my-ipv6-host IPv6 ::1 maps to hostname localhost6 Automatically map hostname to loopback address: yes Automatically map hostname to IPv6 loopback address: yes switch (config) #</pre> |                                |
| <b>Related Commands</b>   | show hosts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |



## ip/ipv6 map-hostname

**{ip |ipv6} map-hostname**  
**no {ip | ipv6} map-hostname**

Maps between the currently-configured hostname and the loopback address 127.0.0.1.

The no form of the command clears the mapping.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | IPv4 mapping is enabled by default<br>IPv6 mapping is disabled by default                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre> switch (config) # ip map-hostname switch (config) # # show hosts Hostname: switch Name server: 9.9.9.9 (configured) Name server: 10.211.0.121 (dynamic) Name server: 172.30.0.126 (dynamic) Name server: 10.4.0.135 (dynamic) Domain name: mydomain.com (configured) Domain name: lab.mtl.com (dynamic) Domain name: vmlab.mtl.com (dynamic) Domain name: yok.mtl.com (dynamic) Domain name: mtl.com (dynamic) IP 1.1.1.1 maps to hostname p IP 127.0.0.1 maps to hostname localhost IP 2.2.2.2 maps to hostname my-host IPv6 2001::8f9 maps to hostname my-ipv6-host IPv6 ::1 maps to hostname localhost6 Automatically map hostname to loopback address: yes Automatically map hostname to IPv6 loopback address: yes switch (config) # switch (config) # ping my-host-name PING localhost (127.0.0.1) 56(84) bytes of data. 64 bytes from localhost (127.0.0.1): icmp_seq=1 ttl=64 time=0.078 ms 64 bytes from localhost (127.0.0.1): icmp_seq=2 ttl=64 time=0.052 ms 64 bytes from localhost (127.0.0.1): icmp_seq=3 ttl=64 time=0.058 ms </pre> |
| <b>Related Commands</b>   | show hosts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If no mapping is configured, a mapping between the hostname and the IPv4 loopback address 127.0.0.1 will be added</li> <li>• The no form of the command maps the hostname to the IPv6 loopback address if there is no statically configured mapping from the hostname to an IPv6 address (disabled by default)</li> <li>• Static host mappings are preferred over DNS results. As a result, with this option set, you will not be able to look up your hostname on your configured DNS server; but without it set, some problems may arise if your hostname cannot be looked up in DNS.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |

## show hosts

### show hosts

Displays hostname, DNS configuration, and static host mappings.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config) # show hosts Hostname: my-host-name Name server: 9.9.9.9 (configured) Name server: 10.211.0.121 (dynamic) Name server: 172.30.0.126 (dynamic) Name server: 10.4.0.135 (dynamic) Domain name: mydomain.com (configured) Domain name: lab.mtl.com (dynamic) Domain name: vmlab.mtl.com (dynamic) Domain name: yok.mtl.com (dynamic) Domain name: mtl.com (dynamic) IP 1.1.1.1 maps to hostname p IP 127.0.0.1 maps to hostname localhost IP 2.2.2.2 maps to hostname my-host IPv6 ::1 maps to hostname localhost6 Automatically map hostname to loopback address: yes Automatically map hostname to IPv6 loopback address: no switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

### 4.1.6.3 Routing

## ip/ipv6 route

**{ip | ipv6} route <network-prefix> <netmask> {<nexthop-address> | <ifname>}**  
**no ip route <network-prefix> <netmask> {<nexthop-address> | <ifname>}**

Sets a static route for a given IP.

The no form of the command deletes the static route.

|                    |                                                           |                                                                                                                                                                                                                         |            |           |           |
|--------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|-----------|
| Syntax Description | network-prefix                                            | IPv4 or IPv6 network prefix.                                                                                                                                                                                            |            |           |           |
|                    | netmask                                                   | IPv4 netmask formats are: <ul style="list-style-type: none"><li>• /24</li><li>• 255.255.255.0</li></ul> IPv6 netmask format is: <ul style="list-style-type: none"><li>• /48 (as a part of the network prefix)</li></ul> |            |           |           |
|                    | nexthop-address                                           | The IPv4 or IPv6 address of the next hop router for this route.                                                                                                                                                         |            |           |           |
|                    | ifname                                                    | The interface name (e.g., mgmt0, mgmt1).                                                                                                                                                                                |            |           |           |
| Default            | N/A                                                       |                                                                                                                                                                                                                         |            |           |           |
| Configuration Mode | Config                                                    |                                                                                                                                                                                                                         |            |           |           |
| History            | 3.1.0000                                                  |                                                                                                                                                                                                                         |            |           |           |
| Role               | admin                                                     |                                                                                                                                                                                                                         |            |           |           |
| Example            | switch (config) # ip route 20.20.20.0 255.255.255.0 mgmt0 |                                                                                                                                                                                                                         |            |           |           |
|                    | switch (config) # show ip route                           |                                                                                                                                                                                                                         |            |           |           |
|                    | Destination                                               | Mask                                                                                                                                                                                                                    | Gateway    | Interface | Source    |
|                    | default                                                   | 0.0.0.0                                                                                                                                                                                                                 | 172.30.0.1 | mgmt0     | DHCP      |
|                    | 10.10.10.10                                               | 255.255.255.255                                                                                                                                                                                                         | 0.0.0.0    | mgmt0     | static    |
|                    | 20.10.10.10                                               | 255.255.255.255                                                                                                                                                                                                         | 172.30.0.1 | mgmt0     | static    |
|                    | 20.20.20.0                                                | 255.255.255.0                                                                                                                                                                                                           | 0.0.0.0    | mgmt0     | static    |
|                    | 172.30.0.0                                                | 255.255.0.0                                                                                                                                                                                                             | 0.0.0.0    | mgmt0     | interface |
| Related Commands   | show ip route                                             |                                                                                                                                                                                                                         |            |           |           |
| Note               |                                                           |                                                                                                                                                                                                                         |            |           |           |

## ipv6 default-gateway

**ipv6 default-gateway** {<ip-address> | <ifname>}  
**no ipv6 default-gateway**

Sets a static default gateway.  
 The no form of the command deletes the default gateway.

|                           |                                                                                                                                                                                                   |                                                |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | ip address                                                                                                                                                                                        | The default gateway IP address (IPv4 or IPv6). |
|                           | ifname                                                                                                                                                                                            | The interface name (e.g., mgmt0, mgmt1).       |
| <b>Default</b>            | N/A                                                                                                                                                                                               |                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                            |                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                          | First version                                  |
|                           | 3.2.0500                                                                                                                                                                                          | removed IPv4 configuration option              |
| <b>Role</b>               | admin                                                                                                                                                                                             |                                                |
| <b>Example</b>            | <pre>switch (config) # ip default-gateway ::1 switch (config) # show ip default-gateway static Configured default gateways: ::1 switch (config) #</pre>                                           |                                                |
| <b>Related Commands</b>   | show ip route                                                                                                                                                                                     |                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The configured default gateway will not be used if DHCP is enabled.</li> <li>In order to configure ipv4 default-gateway use 'ip route' command.</li> </ul> |                                                |

## show ip/ipv6 route

**show {ip | ipv6} route [static]**

Displays the routing table in the system.

| Syntax Description  | static                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |           |           |  | Filters the table with the static route entries. |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|-----------|--|--------------------------------------------------|--|--|--|--|-------------|------|---------|-----------|--------|---------|---------|------------|-------|------|-------------|-----------------|---------|-------|--------|-------------|-----------------|------------|-------|--------|------------|---------------|---------|-------|--------|------------|-------------|---------|-------|-----------|--------------------|---------|-----------|--------|-------|--|--|--|------|--|--|--|----|--|-------|--------|---------|--|--|--|----|--|----|-------|---------------------|--|--|--|----|--|-------|-----------|
| Default             | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| Configuration Mode  | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| History             | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| Role                | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| Example             | <div>switch (config) # show ip route</div> <table><thead><tr><th>Destination</th><th>Mask</th><th>Gateway</th><th>Interface</th><th>Source</th></tr></thead><tbody><tr><td>default</td><td>0.0.0.0</td><td>172.30.0.1</td><td>mgmt0</td><td>DHCP</td></tr><tr><td>10.10.10.10</td><td>255.255.255.255</td><td>0.0.0.0</td><td>mgmt0</td><td>static</td></tr><tr><td>20.10.10.10</td><td>255.255.255.255</td><td>172.30.0.1</td><td>mgmt0</td><td>static</td></tr><tr><td>20.20.20.0</td><td>255.255.255.0</td><td>0.0.0.0</td><td>mgmt0</td><td>static</td></tr><tr><td>172.30.0.0</td><td>255.255.0.0</td><td>0.0.0.0</td><td>mgmt0</td><td>interface</td></tr></tbody></table> <div>switch (config) # show ipv6 route</div> <table><thead><tr><th>Destination prefix</th><th>Gateway</th><th>Interface</th><th>Source</th></tr></thead><tbody><tr><td colspan="4">-----</td></tr><tr><td>::/0</td><td></td><td></td><td></td></tr><tr><td>::</td><td></td><td>mgmt0</td><td>static</td></tr><tr><td>::1/128</td><td></td><td></td><td></td></tr><tr><td>::</td><td></td><td>lo</td><td>local</td></tr><tr><td>2222:2222:2222::/64</td><td></td><td></td><td></td></tr><tr><td>::</td><td></td><td>mgmt1</td><td>interface</td></tr></tbody></table> <div>switch (config) #</div> |            |           |           |  |                                                  |  |  |  |  | Destination | Mask | Gateway | Interface | Source | default | 0.0.0.0 | 172.30.0.1 | mgmt0 | DHCP | 10.10.10.10 | 255.255.255.255 | 0.0.0.0 | mgmt0 | static | 20.10.10.10 | 255.255.255.255 | 172.30.0.1 | mgmt0 | static | 20.20.20.0 | 255.255.255.0 | 0.0.0.0 | mgmt0 | static | 172.30.0.0 | 255.255.0.0 | 0.0.0.0 | mgmt0 | interface | Destination prefix | Gateway | Interface | Source | ----- |  |  |  | ::/0 |  |  |  | :: |  | mgmt0 | static | ::1/128 |  |  |  | :: |  | lo | local | 2222:2222:2222::/64 |  |  |  | :: |  | mgmt1 | interface |
| Destination         | Mask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Gateway    | Interface | Source    |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| default             | 0.0.0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 172.30.0.1 | mgmt0     | DHCP      |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| 10.10.10.10         | 255.255.255.255                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.0.0.0    | mgmt0     | static    |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| 20.10.10.10         | 255.255.255.255                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 172.30.0.1 | mgmt0     | static    |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| 20.20.20.0          | 255.255.255.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.0.0.0    | mgmt0     | static    |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| 172.30.0.0          | 255.255.0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0.0.0    | mgmt0     | interface |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| Destination prefix  | Gateway                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Interface  | Source    |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| -----               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| ::/0                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| ::                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | mgmt0      | static    |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| ::1/128             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| ::                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | lo         | local     |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| 2222:2222:2222::/64 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| ::                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | mgmt1      | interface |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| Related Commands    | show ip default-gateway                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |
| Note                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |           |           |  |                                                  |  |  |  |  |             |      |         |           |        |         |         |            |       |      |             |                 |         |       |        |             |                 |            |       |        |            |               |         |       |        |            |             |         |       |           |                    |         |           |        |       |  |  |  |      |  |  |  |    |  |       |        |         |  |  |  |    |  |    |       |                     |  |  |  |    |  |       |           |

## show ip/ipv6 default-gateway

**show {ip | ipv6} default-gateway [static]**

Displays the default gateway.

|                           |                                                                                                                                                                                                                                                           |                                                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | static                                                                                                                                                                                                                                                    | Displays the static configuration of the default gateway. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                       |                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                          |                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                  |                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                     |                                                           |
| <b>Example</b>            | <pre>switch (config) # ip default-gateway 10.10.10.10 switch (config) # show ip default-gateway Active default gateways:     172.30.0.1 (interface: mgmt0) switch (config) # show ip default-gateway static Configured default gateway: 10.10.10.10</pre> |                                                           |
| <b>Related Commands</b>   | show ip default-gateway                                                                                                                                                                                                                                   |                                                           |
| <b>Note</b>               | The configured IPv4 default gateway will not be used if DHCP is enabled.                                                                                                                                                                                  |                                                           |

#### 4.1.6.4 Network to Media Resolution (ARP & NDP)

IPv4 network use Address Resolution Protocol (ARP) to resolve IP address to MAC address, while IPv6 network uses Network Discovery Protocol (NDP) that performs basically the same as ARP.

### ip arp

**ip arp <IP address> <MAC address>**  
**no ip arp <IP address> <MAC address>**

Sets a static ARP entry.  
 The no form of the command deletes the static ARP.

|                    |                                                                       |                   |                   |           |
|--------------------|-----------------------------------------------------------------------|-------------------|-------------------|-----------|
| Syntax Description | IP address                                                            | IPv4 address.     |                   |           |
|                    | MAC address                                                           | MAC address.      |                   |           |
| Default            | N/A                                                                   |                   |                   |           |
| Configuration Mode | Config Interface Management                                           |                   |                   |           |
| History            | 3.2.0500                                                              |                   |                   |           |
| Role               | admin                                                                 |                   |                   |           |
| Example            | switch (config interface mgmt0) #ip arp 20.20.20.20 aa:aa:aa:aa:aa:aa |                   |                   |           |
|                    | switch (config interface mgmt0) # show ip arp                         |                   |                   |           |
|                    | ARP Timeout: 1500                                                     |                   |                   |           |
|                    |                                                                       |                   |                   |           |
|                    | Total number of entries: 6                                            |                   |                   |           |
|                    |                                                                       |                   |                   |           |
|                    | Address                                                               | Type              | MAC Address       | Interface |
|                    | 10.209.1.103                                                          | Dynamic           | 00:02:C9:11:A1:78 | mgmt0     |
|                    | 10.209.1.168                                                          | Dynamic           | 00:02:C9:5E:C3:28 | mgmt0     |
|                    | 10.209.1.104                                                          | Dynamic           | 00:02:C9:11:A1:E6 | mgmt0     |
| 10.209.1.153       | Dynamic                                                               | 00:02:C9:11:A1:86 | mgmt0             |           |
| 10.209.1.105       | Dynamic                                                               | 00:02:C9:5E:0B:56 | mgmt0             |           |
| 10.209.0.1         | Dynamic                                                               | 00:00:5E:00:01:01 | mgmt0             |           |
| 20.20.20.20        | Static                                                                | AA:AA:AA:AA:AA:AA | mgmt0             |           |
| Related Commands   | switch (config interface mgmt0) #                                     |                   |                   |           |
|                    | show ip arp                                                           |                   |                   |           |
|                    | ip route                                                              |                   |                   |           |
| Note               |                                                                       |                   |                   |           |

## ip arp timeout

**ip arp timeout <timeout-value>**

**no ip arp timeout**

Sets the dynamic ARP cache timeout.

The no form of the command sets the timeout to default.

| Syntax Description | timeout-value                                                                                                                                                                                                                                                                                                                                                                                                 | Time (in seconds) that an entry remains in the ARP cache. Range: 60-28800. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Default            | 1500 seconds                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                            |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                            |
| History            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                            |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                            |
| Example            | <pre>switch (config) # ip arp timeout 2000 switch (config) # show ip arp  ARP Timeout: 2000  Total number of entries: 55 IP Address      MAC Address      Interface 1.0.0.2         00:02:c9:5c:30:40  Vlan11 1.0.0.3         00:11:22:33:44:55  Vlan11 2.0.0.2         00:02:c9:5c:30:40  Vlan12 3.0.0.2         00:02:c9:5c:30:40  Vlan13 4.0.0.2         00:02:c9:5c:30:40  Vlan14 switch (config) #</pre> |                                                                            |
| Related Commands   | <pre>ip arp show ip arp</pre>                                                                                                                                                                                                                                                                                                                                                                                 |                                                                            |
| Note               | This value is used as the ARP timeout whenever a new IP interface is created.                                                                                                                                                                                                                                                                                                                                 |                                                                            |



## show ip arp

**show ip arp [interface <type>| <ip-address> | count]**

Displays ARP table.

|                                               |                                                           |                                                                  |                   |           |
|-----------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------|-------------------|-----------|
| Syntax Description                            | interface type                                            | Filters the table according to a specific interface (i.e. mgmt0) |                   |           |
|                                               | ip-address                                                | Filters the table to the specific ip-address                     |                   |           |
|                                               | count                                                     | Shows ARP statistics                                             |                   |           |
| Default                                       | N/A                                                       |                                                                  |                   |           |
| Configuration Mode                            | Any Command Mode                                          |                                                                  |                   |           |
| History                                       | 3.3.3000                                                  |                                                                  |                   |           |
| Role                                          | admin                                                     |                                                                  |                   |           |
| Example                                       | switch-626a54 [standalone: master] (config) # show ip arp |                                                                  |                   |           |
|                                               | Total number of entries: 3                                |                                                                  |                   |           |
|                                               | Address                                                   | Type                                                             | Hardware Address  | Interface |
|                                               | -----                                                     |                                                                  |                   |           |
|                                               | ---                                                       |                                                                  |                   |           |
|                                               | 10.209.0.1                                                | Dynamic ETH                                                      | 00:00:5E:00:01:01 | mgmt0     |
| 10.209.1.120                                  | Dynamic ETH                                               | 00:02:C9:62:E8:C2                                                | mgmt0             |           |
| 10.209.1.121                                  | Dynamic ETH                                               | 00:02:C9:62:E7:42                                                | mgmt0             |           |
| switch (config) # show ip arp count           |                                                           |                                                                  |                   |           |
| ARP Table size: 3 (inband: 0, out of band: 3) |                                                           |                                                                  |                   |           |
| switch (config) #                             |                                                           |                                                                  |                   |           |
| Related Commands                              |                                                           |                                                                  |                   |           |
| Note                                          |                                                           |                                                                  |                   |           |

## ipv6 neighbor

**ipv6 neighbor** <IPv6 address> <ifname> <MAC address>  
**no ipv6 neighbor** <IPv6 address> <ifname> <MAC address>

Adds a static neighbor entry.  
 The no form of the command deletes the static entry.

|                           |                                                                                                                                                                                                                                                                                                   |                                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Syntax Description</b> | IPv6 address                                                                                                                                                                                                                                                                                      | The IPv6 address.                             |
|                           | ifname                                                                                                                                                                                                                                                                                            | The management interface (i.e. mgmt0, mgmt1). |
|                           | MAC address                                                                                                                                                                                                                                                                                       | The MAC address.                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                               |                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                            |                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                          |                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                             |                                               |
| <b>Example</b>            | <pre>switch (config) # ipv6 neighbor 2001:db8:701f::8f9 mgmt0 00:11:22:33:44:55 switch (config) #</pre>                                                                                                                                                                                           |                                               |
| <b>Related Commands</b>   | <pre>show ipv6 neighbor ipv6 route arp clear ipv6 neighbors</pre>                                                                                                                                                                                                                                 |                                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• ARP is used only with IPv4. In IPv6 networks, Neighbor Discovery Protocol (NDP) is used similarly.</li> <li>• Use The no form of the command to remove static entries. Dynamic entries can be cleared via the “clear ipv6 neighbors” command.</li> </ul> |                                               |

## clear ipv6 neighbors

### clear ipv6 neighbors

Clears the dynamic neighbors cache.

|                           |                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | switch (config) # clear ipv6 neighbors<br>switch (config) #                                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | ipv6 neighbor<br>show ipv6 neighbor<br>arp                                                                                                                                                                                                                                                                                                          |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Clearing Neighbor Discovery Protocol (NDP) cache removes only the dynamic entries learned and not the static entries configured</li> <li>• Use the no form of the command to remove static entries</li> <li>• See “clear ipv6 neighbors” on page 776 for the interface or VLAN specific command</li> </ul> |

## show ipv6 neighbors

### show ipv6 neighbors [static]

Displays the Neighbor Discovery Protocol (NDP) table.

| Syntax Description | static                                                                                                                                                                                                                                                                                                                 | Filters only the table of the static entries. |           |        |  |              |     |             |       |        |         |      |                   |           |       |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------|--------|--|--------------|-----|-------------|-------|--------|---------|------|-------------------|-----------|-------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                    |                                               |           |        |  |              |     |             |       |        |         |      |                   |           |       |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                 |                                               |           |        |  |              |     |             |       |        |         |      |                   |           |       |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                               |                                               |           |        |  |              |     |             |       |        |         |      |                   |           |       |
| Role               | admin                                                                                                                                                                                                                                                                                                                  |                                               |           |        |  |              |     |             |       |        |         |      |                   |           |       |
| Example            | <div>switch (config) # show ipv6 neighbors</div> <table><thead><tr><th>IPv6 Address</th><th>Age</th><th>MAC Address</th><th>State</th><th>Interf</th></tr></thead><tbody><tr><td>2001::2</td><td>9428</td><td>AA:AA:AA:AA:AA:AA</td><td>permanent</td><td>mgmt0</td></tr></tbody></table> <div>switch (config) #</div> |                                               |           |        |  | IPv6 Address | Age | MAC Address | State | Interf | 2001::2 | 9428 | AA:AA:AA:AA:AA:AA | permanent | mgmt0 |
| IPv6 Address       | Age                                                                                                                                                                                                                                                                                                                    | MAC Address                                   | State     | Interf |  |              |     |             |       |        |         |      |                   |           |       |
| 2001::2            | 9428                                                                                                                                                                                                                                                                                                                   | AA:AA:AA:AA:AA:AA                             | permanent | mgmt0  |  |              |     |             |       |        |         |      |                   |           |       |
| Related Commands   | ipv6 neighbor<br>clear ipv6 neighbor<br>show ipv6                                                                                                                                                                                                                                                                      |                                               |           |        |  |              |     |             |       |        |         |      |                   |           |       |
| Note               |                                                                                                                                                                                                                                                                                                                        |                                               |           |        |  |              |     |             |       |        |         |      |                   |           |       |

## 4.1.6.5 DHCP

**ip dhcp**

**ip dhcp {default-gateway yield-to-static| hostname <hostname>| primary-intf <ifname> | send-hostname }**

**no ip dhcp {default-gateway yield-to-static| hostname || primary-intf | send-hostname}**

Sets global DHCP configuration.

The no form of the command deletes the DHCP configuration.

| Syntax Description | yield-to-static                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Does not allow you to install a default gateway from DHCP if there is already a statically configured one.            |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------|--|------|------|-------|-----------|---------|---------|-------|-------|--|--|--|----|----|----|----|-------|-----|-----|-----|-------|-----|-----|----|
|                    | hostname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Specifies the hostname to be sent during DHCP client negotiation if send-hostname is enabled.                         |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
|                    | primary-intf <ifname>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sets the interface from which a non-interface-specific configuration (resolver and routes) will be accepted via DHCP. |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
|                    | send-hostname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Enables the DHCP client to send a hostname during negotiation.                                                        |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| Default            | no ip dhcp yield-to-static<br>no ip dhcp hostname<br>ip ip dhcp primary-intf mgmt0<br>no ip dhcp send-hostname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                       |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                       |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                       |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                       |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| Example            | <pre>switch (config) # ip dhcp default-gateway yield-to-static switch (config) # show ip dhcp</pre> <table><thead><tr><th></th><th>DHCP</th><th>DHCP</th><th>Valid</th></tr><tr><th>Interface</th><th>Enabled</th><th>Running</th><th>lease</th></tr><tr><th colspan="4">-----</th></tr></thead><tbody><tr><td>lo</td><td>no</td><td>no</td><td>no</td></tr><tr><td>mgmt0</td><td>yes</td><td>yes</td><td>yes</td></tr><tr><td>mgmt1</td><td>yes</td><td>yes</td><td>no</td></tr></tbody></table> <pre>DHCP primary interface:   Configured: mgmt0   Active:     mgmt0  DHCP default gateway yields to static configuration: yes  DHCP client options:   Send Hostname:  no   Client Hostname: switch (using system hostname) switch (config) #</pre> |                                                                                                                       |       |  | DHCP | DHCP | Valid | Interface | Enabled | Running | lease | ----- |  |  |  | lo | no | no | no | mgmt0 | yes | yes | yes | mgmt1 | yes | yes | no |
|                    | DHCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DHCP                                                                                                                  | Valid |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| Interface          | Enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Running                                                                                                               | lease |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| -----              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                       |       |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| lo                 | no                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | no                                                                                                                    | no    |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| mgmt0              | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | yes                                                                                                                   | yes   |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |
| mgmt1              | yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | yes                                                                                                                   | no    |  |      |      |       |           |         |         |       |       |  |  |  |    |    |    |    |       |     |     |     |       |     |     |    |

---

|                         |                              |
|-------------------------|------------------------------|
| <b>Related Commands</b> | show ip dhcp<br>dhcp [renew] |
|-------------------------|------------------------------|

---

|             |                                           |
|-------------|-------------------------------------------|
| <b>Note</b> | DHCP is supported for IPv4 networks only. |
|-------------|-------------------------------------------|

---

---

## show ip dhcp

### show ip dhcp

Displays the DHCP configuration and status.

|                           |                                                                                                                                                                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show ip dhcp DHCP primary interface:     Configured: mgmt0     Active:      mgmt0  DHCP: yield default gateway to static configuration: yes  DHCP Client Options:     Send Hostname:    no     Client Hostname:  switch (using system hostname) switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>ip dhcp dhcp [renew]</pre>                                                                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                |

#### 4.1.6.6 General IPv6 Commands

### ipv6 enable

**ipv6 enable**  
**no ipv6 enable**

Enables IPv6 globally on the management interface.  
 The no form of the command disables IPv6 globally on the management interface.

|                           |                                                                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                          |
| <b>Default</b>            | IPv6 is disabled                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # ipv6 enable switch (config) # show ipv6 IPv6 summary   IPv6 supported:          yes   IPv6 admin enabled:     yes   IPv6 interface count:   2 switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>ipv6 default-gateway ipv6 host ipv6 map-hostname ipv6 neighbor ipv6 route show ipv6 show ipv6 default-gateway show ipv6 route</pre>                                                     |
| <b>Note</b>               |                                                                                                                                                                                              |



### 4.1.6.7 IP Diagnostic Tools

## ping

**ping** [-LRUbdnqrvVaA] [-c count] [-i interval] [-w deadline] [-p pattern] [-s packetsize] [-t ttl] [-I interface or address] [-M mtu discovery hint] [-S sndbuf] [-T timestamp option] [-Q tos] [hop1 ...] destination

Sends ICMP echo requests to a specified host.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | Linux Ping options <a href="http://linux.about.com/od/commands/l/blcm-dl8_ping.htm">http://linux.about.com/od/commands/l/blcm-dl8_ping.htm</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # ping 172.30.2.2 PING 172.30.2.2 (172.30.2.2) 56(84) bytes of data. 64 bytes from 172.30.2.2: icmp_seq=1 ttl=64 time=0.703 ms 64 bytes from 172.30.2.2: icmp_seq=2 ttl=64 time=0.187 ms 64 bytes from 172.30.2.2: icmp_seq=3 ttl=64 time=0.166 ms 64 bytes from 172.30.2.2: icmp_seq=4 ttl=64 time=0.161 ms 64 bytes from 172.30.2.2: icmp_seq=5 ttl=64 time=0.153 ms 64 bytes from 172.30.2.2: icmp_seq=6 ttl=64 time=0.144 ms ^C --- 172.30.2.2 ping statistics --- 6 packets transmitted, 6 received, 0% packet loss, time 5004ms rtt min/avg/max/mdev = 0.144/0.252/0.703/0.202 ms switch (config) #</pre> |
| <b>Related Commands</b>   | tracert                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## traceroute

```
traceroute [-46dFITUnrAV] [-f first_ttl] [-g gate,...] [-i device] [-m max_ttl] [-N
squeries] [-p port] [-t tos] [-l flow_label] [-w waittime] [-q nqueries] [-s src_addr]
[-z sendwait] host [packetlen]
```

Traces the route packets take to a destination.

|                    |    |                                                                                                                                                                                                                                                           |
|--------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | -4 | Uses IPv4.                                                                                                                                                                                                                                                |
|                    | -6 | Uses IPv6.                                                                                                                                                                                                                                                |
|                    | -d | Enables socket level debugging.                                                                                                                                                                                                                           |
|                    | -F | Sets DF (do not fragment bit) on.                                                                                                                                                                                                                         |
|                    | -I | Uses ICMP ECHO for tracerouting.                                                                                                                                                                                                                          |
|                    | -T | Uses TCP SYN for tracerouting.                                                                                                                                                                                                                            |
|                    | -U | Uses UDP datagram (default) for tracerouting.                                                                                                                                                                                                             |
|                    | -n | Does not resolve IP addresses to their domain names.                                                                                                                                                                                                      |
|                    | -r | Bypasses the normal routing and send directly to a host on an attached network.                                                                                                                                                                           |
|                    | -A | Performs AS path lookups in routing registries and print results directly after the corresponding addresses.                                                                                                                                              |
|                    | -V | Prints version info and exit.                                                                                                                                                                                                                             |
|                    | -f | Starts from the first_ttl hop (instead from 1).                                                                                                                                                                                                           |
|                    | -g | Routes packets throw the specified gateway (maximum 8 for IPv4 and 127 for IPv6).                                                                                                                                                                         |
|                    | -i | Specifies a network interface to operate with.                                                                                                                                                                                                            |
|                    | -m | Sets the max number of hops (max TTL to be reached). Default is 30.                                                                                                                                                                                       |
|                    | -N | Sets the number of probes to be tried simultaneously (default is 16).                                                                                                                                                                                     |
|                    | -p | Uses destination port. It is an initial value for the UDP destination port (incremented by each probe, default is 33434), for the ICMP seq number (incremented as well, default from 1), and the constant destination port for TCP tries (default is 80). |
|                    | -t | Sets the TOS (IPv4 type of service) or TC (IPv6 traffic class) value for outgoing packets.                                                                                                                                                                |
|                    | -l | Uses specified flow_label for IPv6 packets.                                                                                                                                                                                                               |
|                    | -w | Sets the number of seconds to wait for response to a probe (default is 5.0). Non-integer (float point) values allowed too.                                                                                                                                |
|                    | -q | Sets the number of probes per each hop. Default is 3.                                                                                                                                                                                                     |
|                    | -s | Uses source src_addr for outgoing packets.                                                                                                                                                                                                                |
|                    | -z | Sets minimal time interval between probes (default is 0). If the value is more than 10, then it specifies a number in milliseconds, else it is a number of seconds (float point values allowed too).                                                      |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre> switch (config) # traceroute 192.168.10.70 traceroute to 192.168.10.70 (192.168.10.70), 30 hops max, 40 byte pack- ets  1 172.30.0.1 (172.30.0.1) 3.632 ms 2.849 ms 3.544 ms  2 10.222.128.46 (10.222.128.46) 3.176 ms 3.289 ms 3.656 ms  3 10.158.128.30 (10.158.128.30) 15.331 ms 15.819 ms 16.388 ms  4 10.158.128.65 (10.158.128.65) 20.468 ms 7.893 ms 12.27 ms  5 10.7.34.115 (10.7.34.115) 16.405 ms 11.985 ms 12.264 ms  6 192.168.10.70 (192.168.10.70) 16.377 ms 16.091 ms 20.475 ms switch (config) # </pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## tcpdump

```
tcpdump [-aAdDeflLnNOpqRStuUvxX] [-c count] [-C file_size]
 [-E algo:secret] [-F file] [-i interface] [-M secret]
 [-r file] [-s snaplen] [-T type] [-w file]
 [-W filecount] [-y datalinktype] [-Z user]
 [expression]
```

Invokes standard binary, passing command line parameters straight through. Runs in foreground, printing packets as they arrive, until the user hits Ctrl+C.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # tcpdump ..... 09:37:38.678812 IP 192.168.10.7.ssh &gt; 192.168.10.1.54155: P 1494624:1494800(176) ack 625 win 90 &lt;nop,nop,timestamp 5842763 858672398&gt; 09:37:38.678860 IP 192.168.10.7.ssh &gt; 192.168.10.1.54155: P 1494800:1495104(304) ack 625 win 90 &lt;nop,nop,timestamp 5842763 858672398&gt; ... 9141 packets captured 9142 packets received by filter 0 packets dropped by kernel switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## 4.2 NTP, Clock & Time Zones

Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks. NTP is intended to synchronize all participating computers to within a few milliseconds of Coordinated Universal Time (UTC) and is designed to mitigate the effects of variable network latency. NTP can usually maintain time to within tens of milliseconds over the public Internet, and can achieve better than one millisecond accuracy in local area networks under ideal conditions.

## 4.2.1 Commands

### clock set

**clock set** <hh:mm:ss> [<yyyy/mm/dd>]

Sets the time and date.

|                           |                                                                                                                                                                                                                  |       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Syntax Description</b> | hh:mm:ss                                                                                                                                                                                                         | Time. |
|                           | yyyy/mm/dd                                                                                                                                                                                                       | Date. |
| <b>Default</b>            | N/A                                                                                                                                                                                                              |       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                           |       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                         |       |
| <b>Role</b>               | admin                                                                                                                                                                                                            |       |
| <b>Example</b>            | <pre>switch (config) # clock set 23:23:23 2010/08/19 switch (config) # show clock Time:      23:23:26 Date:      2010/08/19 Time zone: UTC             (Etc/UTC) UTC offset: same as UTC switch (config) #</pre> |       |
| <b>Related Commands</b>   | show clock                                                                                                                                                                                                       |       |
| <b>Note</b>               | If not specified, the date will be left the same.                                                                                                                                                                |       |

## clock timezone

**clock timezone [<zone word> [<zone word> [<zone word>] [<zone word>]]]**

Sets the system time zone. The time zone may be specified in one of three ways:

- A nearby city whose time zone rules to follow. The system has a large list of cities which can be displayed by the help and completion system. They are organized hierarchically because there are too many of them to display in a flat list. A given city may be required to be specified in two, three, or four words, depending on the city.
  - An offset from UTC. This will be in the form UTC-offset UTC, UTC-offset UTC+<0-14>, UTC-offset UTC-<1-12>.
  - UTC (Universal Time, which is almost identical to GMT), and this is the default time zone
- The no form of the command resets time zone to its default (GMT).

|                           |                                                                                                                                                                                                                             |                                                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | zone word                                                                                                                                                                                                                   | The possible forms this could take include: continent, city, continent, country, city, continent, region, country, city, ocean, and/or island. |
| <b>Default</b>            | GMT                                                                                                                                                                                                                         |                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                      |                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                    |                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                       |                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # clock timezone America North United_States Other New_York switch (config) # show clock Time: 04:21:44 Date: 2012/02/26 Time zone: America North United_States Other New_York switch (config) #</pre> |                                                                                                                                                |
| <b>Related Commands</b>   | show clock                                                                                                                                                                                                                  |                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                             |                                                                                                                                                |



## ntp

**ntp {disable | enable | {peer | server} <IP address> [version <number> | disable]}**  
**no ntp {disable | enable | {peer | server} <IP address> [disable]}**

Configures NTP.  
 The no form of the command negates NTP options.

|                           |                                                                          |                                                                            |
|---------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | disable                                                                  | Disables NTP.                                                              |
|                           | enable                                                                   | Enables NTP.                                                               |
|                           | peer or server                                                           | Configures an NTP peer or server node.                                     |
|                           | IP address                                                               | IPv4 or IPv6 address.                                                      |
|                           | version <number>                                                         | Specifies the NTP version number of this peer. Possible values are 3 or 4. |
| <b>Default</b>            | NTP is enabled.<br>NTP version number is 4.                              |                                                                            |
| <b>Configuration Mode</b> | Config                                                                   |                                                                            |
| <b>History</b>            | 3.1.0000                                                                 |                                                                            |
| <b>Role</b>               | admin                                                                    |                                                                            |
| <b>Example</b>            | switch (config) # no ntp peer 192.168.10.24 disable<br>switch (config) # |                                                                            |
| <b>Related Commands</b>   | N/A                                                                      |                                                                            |
| <b>Note</b>               |                                                                          |                                                                            |

## ntpdate

**ntpdate <IP address>**

Sets the system clock using the specified SNTP server.

| Syntax Description        | IP address                                                                                                                                                                                                 | IP. |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Default</b>            | N/A                                                                                                                                                                                                        |     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                     |     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                   |     |
| <b>Role</b>               | admin                                                                                                                                                                                                      |     |
| <b>Example</b>            | <pre>switch (config) # ntpdate 192.168.10.10 26 Feb 17:25:40 ntpdate[15206]: adjust time server 192.168.10.10 offset -0.000092 sec switch (config) #</pre>                                                 |     |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                        |     |
| <b>Note</b>               | <p>This is a one-time operation and does not cause the clock to be kept in sync on an ongoing basis. It will generate an error if SNTP is enabled since the socket it requires will already be in use.</p> |     |

## show clock

### show clock

Displays the current system time, date and time zone.

|                           |                                                                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # show clock Time: 04:21:44' Date: 2012/02/26 Time zone: America North United_States Other New_York switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                  |

## show ntp

### show ntp

Displays the current NTP settings.

|                           |                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                 |
| <b>Example</b>            | switch (config) # show ntp<br>NTP is enabled.<br>Clock is unsynchronized.<br>No NTP peers or servers configured.<br>switch (config) # |
| <b>Related Commands</b>   | N/A                                                                                                                                   |
| <b>Note</b>               |                                                                                                                                       |

## 4.3 Unbreakable Links

MLNX-OS® offers a phy profile configuration for VPI interfaces.

PHY profile includes Link Level Retransmission (LLR) configuration. A PHY profile is bind to any VPI interface.

### 4.3.1 Link Level Retransmission (LLR)

Link Level Retransmission (LLR) is used on signal integrity marginal systems to decrease and/or eliminate the impact of physical errors on the system's performance.

- LLR transmitter breaks the transmitted Layer 2 data stream into Cells and adds a CRC checksum to each cell.
- LLR receiver checks the Cell CRC, in case there is no CRC errors, it forwards the cell and acknowledges the peer.

If a cell is dropped by the receiver the transmitter retransmits the cell.



LLR is a Mellanox proprietary feature and will only work with Mellanox to Mellanox ports.



LLR is not operational for cables longer then 30m.

### LLR Mode

The following LLR modes are applicable per port per speed:

- disable – no LLR
- enable – the port becomes passive, only if it got a request to use LLR it activates, otherwise it remains disabled
- enable-request – the port becomes active, it keeps sending LLR requests to the peer

### LLR Negotiation

Both ports on the link perform LLR discovery and negotiation. In order the LLR to be in active state on the link, the following should apply:

- One port must be configured with LLR “enable-request” on the specified speed.
- The other port (peer) may be configured with LLR “enable-request” or “enable” on the same specified speed



If both the local port and remote port configured with LLR “enabled” the LLR negotiation will not be activated - the ports will remain in LLR in-active state.

### LLR Status

LLR status is a port parameter that states the current state of the LLR.

- Active – LLR is operationally running
- In-Active – LLR is not running

### 4.3.2 Configuring Phy Profile & LLR

➤ *To configure a phy profile:*

**Step 1.** Create/edit a phy profile and enter a phy profile configuration mode. Run:

```
switch (config) # phy-profile my-profile
switch (config phy profile my-profile) #
```

**Step 2.** Configure LLR attributes. Run:



All ports mapped to the phy profile must be in shutdown state before editing the profile.

```
switch (config phy profile my-profile) # llr support ib speed FDR enable-request
switch (config phy profile my-profile) # llr support ib speed QDR disable
switch (config phy profile my-profile) # ...
```

**Step 3.** Bind the profile to the desired interface. Run:



The port must be in shutdown state before binding the phy-profile.

```
switch (config) # interface ib 1/1
switch (config interface ib 1/1) # shutdown
switch (config interface ib 1/1) # phy-profile map my-profile
switch (config interface ib 1/1) # no shutdown
switch (config interface ib 1/1) #
```

**Step 4.** Verify LLR configuration and status. Run:

```
switch (config) # show interface ib llr

Interface phy-profile LLR status ...
ib 1/1 my-profile Active
ib 1/2 disable Inactive
...
switch (config) #
```

**Step 5.** Display phy-profile configuration. Run:

```
switch (config) # show phy-profile my-profile
Profile: my-profile
llr support ib-speed
SDR: disable
DDR: disable
QDR: disable
FDR10: enable-request
FDR: enable-request
switch (config) #
```

### 4.3.3 Commands

## phy-profile

**phy-profile <profile-name>**  
**no phy-profile <profile-name>**

Creates a PHY profile (port physical parameters), and enter the profile configuration mode.

The no form of the command deletes the phy-profile

|                           |                                                                                                                                                |                 |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Syntax Description</b> | profile-name                                                                                                                                   | 40-byte-string. |
| <b>Default</b>            | “high-speed-ber”: FDR and FDR10 speeds are LLR enable-request state, all the rest speed options are in disable state.                          |                 |
| <b>Configuration Mode</b> | Config                                                                                                                                         |                 |
| <b>History</b>            | 3.2.0700                                                                                                                                       | First version   |
|                           | 3.3.3000                                                                                                                                       | Default updated |
| <b>Role</b>               | admin                                                                                                                                          |                 |
| <b>Example</b>            | <pre>switch (config) # phy-profile my-profile switch (config phy-profile my-profile) #</pre>                                                   |                 |
| <b>Related Commands</b>   |                                                                                                                                                |                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>10 profiles is the maximum profiles supported.</li> </ul>                                               |                 |
|                           | <ul style="list-style-type: none"> <li>When deleting a profile, all interface related to that profile need to be in shutdown state.</li> </ul> |                 |

## llr support ib-speed

**llr support ib-speed <speed-options> <speed-actions>**

**no llr support ib-speed <speed-options>**

Sets LLR InfiniBand supported speeds.

The no form of the command disables the llr on this speed.

|                           |                                                                                                                                                                    |                                                                                                                       |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | speed-options                                                                                                                                                      | <ul style="list-style-type: none"> <li>• sdr</li> <li>• ddr</li> <li>• qdr</li> <li>• fdr10</li> <li>• fdr</li> </ul> |
|                           | speed-action                                                                                                                                                       | enable: only enable bit is on (passive mode)<br>enable-request: both enable and request bits are on (active mode)     |
| <b>Default</b>            | N/A                                                                                                                                                                |                                                                                                                       |
| <b>Configuration Mode</b> | Config Phy-Profile                                                                                                                                                 |                                                                                                                       |
| <b>History</b>            | 3.2.0700                                                                                                                                                           |                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                              |                                                                                                                       |
| <b>Example</b>            | <pre>switch (config) # phy-profile my-profile switch (config phy-profile my-profile) # llr support speed fdr enable switch (config phy-profile my-profile) #</pre> |                                                                                                                       |
| <b>Related Commands</b>   |                                                                                                                                                                    |                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                    |                                                                                                                       |



## phy-profile map

**phy-profile map <profile-name>**  
**no phy-profile map**

Binds a phy-profile to the interface.  
 The no form of the command set the port mapping to the default profile.

|                           |                                                                                                                                                                   |                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Syntax Description</b> | profile-name                                                                                                                                                      | 40-byte-string. |
| <b>Default</b>            | Default profile - “high-speed-ber” with the following attributes:<br>SDR: disable<br>DDR: disable<br>QDR: disable<br>FDR10: enable-request<br>FDR: enable-request |                 |
| <b>Configuration Mode</b> | Config Interface IB                                                                                                                                               |                 |
| <b>History</b>            | 3.2.0700                                                                                                                                                          | First version   |
|                           | 3.3.3000                                                                                                                                                          | Default updated |
| <b>Role</b>               | admin                                                                                                                                                             |                 |
| <b>Example</b>            | <pre>switch (config) # interface ib 1/1 switch (config interface ib 1/1) #phy-profile map my-profile switch (config interface ib 1/1) #</pre>                     |                 |
| <b>Related Commands</b>   |                                                                                                                                                                   |                 |
| <b>Note</b>               |                                                                                                                                                                   |                 |

## show phy-profile

### show phy-profile [profile-name]

Shows phy-profile list

|                           |                                                                                                                                                                                                      |                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Syntax Description</b> | profile-name                                                                                                                                                                                         | 40-byte-string.<br>Shows a specific profile. |
| <b>Default</b>            | N/A                                                                                                                                                                                                  |                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                     |                                              |
| <b>History</b>            | 3.2.0700                                                                                                                                                                                             | First version                                |
|                           | 3.3.3000                                                                                                                                                                                             | Output updated.                              |
| <b>Role</b>               | admin                                                                                                                                                                                                |                                              |
| <b>Example</b>            | <pre>switch (config) # show phy-profile Profile: high-speed-ber ----- llr support ib-speed SDR: disable DDR: disable QDR: disable FDR10: enable-request FDR: enable-request  switch (config) #</pre> |                                              |
| <b>Related Commands</b>   | phy-profile                                                                                                                                                                                          |                                              |
| <b>Note</b>               |                                                                                                                                                                                                      |                                              |

## show llr

### show interface ib [<number>] llr

Shows LLR status

| Syntax Description | number                                                                                                                                                                                                                                | The interface number |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Default            | N/A                                                                                                                                                                                                                                   |                      |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                      |                      |
| History            | 3.2.0500                                                                                                                                                                                                                              |                      |
| Role               | admin                                                                                                                                                                                                                                 |                      |
| Example            | <pre>switch (config) # show interface ib llr Interface    phy-profile    LLR status Ib 1/1       high-speed-ber    Active Ib 1/2       high-speed-ber    Inactive Ib 1/3       high-speed-ber    Inactive ... switch (config) #</pre> |                      |
| Related Commands   |                                                                                                                                                                                                                                       |                      |
| Note               |                                                                                                                                                                                                                                       |                      |

## 4.4 Virtual Protocol Interconnect (VPI)

Virtual Protocol Interconnect (VPI) technology allows InfiniBand and Ethernet traffic to co-exist on one platform.

VPI technology can be achieved in different levels:

- System level VPI – it can be decided, per system, whether to use InfiniBand or Ethernet for all the interfaces in the system. Either Ethernet switch or InfiniBand switch profile can be configured on the system in order to determine the running link protocol for all the system ports.
- Interface level VPI – it can be decided, per system port, whether to use InfiniBand or Ethernet as a link protocol. A single VPI SWID can be configured as the system profile, and, per port, the link protocol may be selected. Configuring the switch to VPI mode allows splitting the hardware into two separate switches (an Ethernet switch and an InfiniBand switch). Traffic does not pass between those switches. While configuring the VPI system profile, bridging (or gateway) capabilities can be added to pass traffic from the Ethernet to the InfiniBand hosts.

Configuring your system to VPI single-switch mode splits your network interfaces to two groups:

- The Ethernet set of ports, which are connected to the Ethernet switch
- The InfiniBand set of ports, which are connected to the InfiniBand switch



VPI single switch profile is not a gateway. Ethernet traffic does not pass to the InfiniBand ports and vice versa.



VPI mode requires using either a SX6036G system, or installing a license (UPGR-XXXX-GW) on SX1012, SX1700, SX1710, SX1036, SX6012, SX6018, and SX6710 and SX6036. Refer to [Section 2.4, “Licenses,” on page 39](#) for more details on the licenses.

In order to set your system to work with VPI, the system profile should be changed to “vpi-single-switch”. In addition, the required set of ports should be changed from InfiniBand to Ethernet or vice versa.

The following systems can be configured as VPI switches:

- SX1012, SX1700, SX1710, SX1036
- SX6012, SX6018, SX6710, SX6036, SX6036G



The SX6036G system supports VPI by default, with the port configured as follows:

- Interfaces 1/1-1/8 Ethernet
- Interfaces 1/9-1/36 InfiniBand

### ➤ *To make an Ethernet switch system support VPI in a single-switch mode:*

**Step 1.** Make sure you have the latest software version installed.

**Step 2.** Install a gateway license.

**Step 3.** Set the system profile to be “vpi-single-switch”.



When changing to a VPI profile the number of unicast MAC addresses is decreased by 2k to 46k entries.

**Step 4.** Use the port type force command to change the disabled ports from Ethernet to InfiniBand.



This step may take several minutes.

```
switch (config)# license install <license>
switch (config)# system profile vpi-single-switch
...
switch (config)# port 1/9-1/36 type infiniband force
switch (config)# show ports type
Ethernet: 1/1, 1/2, ... 1/8
Infiniband: 1/9, 1/10 ... 1/36
switch (config) #
```

➤ **To make an InfiniBand switch system support VPI in a single-switch mode:**

**Step 1.** Make sure you have the latest software version installed

**Step 2.** Install a gateway license. See [Section 2.4, “Licenses,”](#) on page 39.

**Step 3.** Set the system profile to be “vpi-single-switch”.

**Step 4.** Use the command port type force to change the disabled ports from InfiniBand to Ethernet.

```
switch (config)# license install <license>
switch (config)# system profile vpi-single-switch
...
switch (config)# port 1/1-1/8 type ethernet force
switch (config)# interface ethernet 1/1-1/8 no shutdown
switch (config)# show ports type
Ethernet: 1/1, 1/2, ... 1/8
Infiniband: 1/9, 1/10 ... 1/36
switch (config) #
```



Changing the system profile deletes all the existing switch configurations and reboots the system. Management connectivity, however, is kept.



Note that the port type force command is valid for admin state only. In case of ETH ports, the user must remove specific configurations such as LAG, port mirror and split before moving to InfiniBand mode.

## 4.4.1 Commands

### port type

**port <slot>/<port>[-<slot>/<port>] type <ethernet/infiniband> [force]**  
**no port <slot>/<port>[-<slot>/<port>] type <ethernet/infiniband>**

Sets the port link protocol type on a specific port or a range of ports.  
 The no form of the command sets the port type to default on the specified port(s).

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | slot/port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The port number.                                                                                                       |
|                           | type <ethernet/infiniband>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | The desired port type. Options are: <ul style="list-style-type: none"> <li>• InfiniBand</li> <li>• Ethernet</li> </ul> |
|                           | force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Forces a port type change regardless of the admin's state                                                              |
| <b>Default</b>            | The default value depends on the system: <ul style="list-style-type: none"> <li>• SX10xx systems have Ethernet as default</li> <li>• SX60xx systems have InfiniBand as default</li> <li>• The SX6036G system has 1/1-1/8 as Ethernet and 1/9-1/36 as InfiniBand by default</li> </ul>                                                                                                                                                                                                                                                                                                                  |                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                        |
| <b>History</b>            | 3.2.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                        |
|                           | 3.3.4100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ability to configure specific ports                                                                                    |
|                           | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Removed “force” parameter                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # port 1/1-1/8 type ethernet switch (config) # show ports type</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                        |
|                           | <pre>Ethernet: 1/1, 1/2, ... 1/8 Infiniband: 1/9, 1/10 ... 1/36 switch (config) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                        |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• System profile must be vpi-single-switch. Refer to the command ‘system profile’.</li> <li>• For the “non-force” version of the command: The interface(s) must be disabled, and must not be split, mirrored or part of a port-channel when running the command.</li> <li>• For the “force” version of the command: The interface must not be split, mirrored or part of a port-channel when running the command.</li> <li>• If one or more ports in a range cannot change protocol, a printout indicates it but action continues on the other ports</li> </ul> |                                                                                                                        |

## show ports type

### show ports type

Displays the link protocol configuration in the system.

|                           |                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                           |
| <b>Default</b>            | N/A                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                              |
| <b>History</b>            | 3.2.1100                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                         |
| <b>Example</b>            | switch (config) # show ports type<br><br>Ethernet: 1/1, 1/2, ... 1/24<br>Infiniband: 1/25, 1/26 ... 1/36<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                                                               |
| <b>Note</b>               |                                                                                                                               |

## 4.5 System Profile

MLNX-OS has the ability to change the system profile upon license acquisition. The following are the possible system profiles:

- Ethernet single switch
- InfiniBand single switch
- InfiniBand single switch without adaptive routing
- VPI single switch

Changing the system profile requires one of the following licenses:

- Ethernet systems require a UPGR-10xx-GW license to change the system's profile to InfiniBand or VPI
- InfiniBand systems require a UPGR-60xx-GW license to change the system's profile to Ethernet or VPI



Changing the system profile will delete all the existing switch configuration and reboot the system. Management connectivity, however, will be kept.



Externally managed InfiniBand switch systems cannot run an Ethernet license.

### ➤ *To change the system profile:*

**Step 1.** Verify the appropriate license is installed. Run `show licenses`.

**Step 2.** To change the system profile to:

- an Ethernet system profile, run `system profile eth-single-switch`.
- an InfiniBand system profile, run `system profile ib-single-switch`.
- InfiniBand without adaptive system profile, run `ib-no-adaptive-routing-single-switch`.
- a VPI system profile, run `system profile vpi-single-switch`.

Upon approval, the configuration is deleted and the switch is rebooted with the new profile.

**Step 3.** To verify the system profile, run `show system profile`.



In case the system profile is `vpi-single-switch`, it is possible to change the link protocol from InfiniBand to Ethernet or vice versa using “port type” command.



## 4.5.1 Commands

### system profile

#### system profile <profile> [force]

Sets the profile of the system to either InfiniBand, Ethernet or VPI.

- In ib-single-switch profile, all network interfaces link protocol set to InfiniBand.
- In ib-no-adaptive-routing-single-switch profile, all network interfaces link protocol set to InfiniBand with disabled adaptive routing.
- In eth-single-switch profile, all network interfaces link protocol set to Ethernet.
- In vpi-single-switch profile, some ports can be defined as Ethernet while some other as InfiniBand.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• eth-single-switch</li> <li>• ib-single-switch</li> <li>• ib-no-adaptive-routing-single-switch</li> <li>• vpi-single-switch</li> </ul> |
|                           | force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Force operation, without the need for user confirmation.                                                                                                                       |
| <b>Default</b>            | The default system profile depends on the system:<br>SX6xxx systems have “ib-single-switch” as default<br>SX1xxx systems have “eth-single-switch” as default<br>SX6036G system has “vpi-single-switch” as default                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | First version                                                                                                                                                                  |
|                           | 3.2.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Added “vpi-single-switch” option                                                                                                                                               |
|                           | 3.3.4100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Added SX6036G                                                                                                                                                                  |
|                           | 3.3.4302                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Added system profile ib-no-adaptive-routing-single-switch                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # system profile eth-single-switch switch (config) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                |
| <b>Related Commands</b>   | <pre>show system profile port type show ports type</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This command requires a license. Refer to “Licenses” section in the <i>MLNX-OS SwitchX User Manual</i>.</li> <li>• This command deletes all switch configuration (keeping IP connectivity) and resets the system.</li> <li>• System profile “ib-no-adaptive-routing-single-switch profile” is the default profile for InfiniBand switches.</li> <li>• Adaptive routing is not available on system profile “vpi-single-switch”.</li> <li>• Refer to the ‘port type’ command in order to change the link protocol.</li> </ul> |                                                                                                                                                                                |

## 4.6 Software Management

### 4.6.1 Upgrading MLNX-OS Software



When upgrading from a software version older than 3.2.0100 to software version 3.3.0000 or higher, the upgrade procedure must be done in two steps. First update the software to 3.2.0300-100 (for InfiniBand platforms) or 3.2.0506 (for Ethernet platforms), then update to the desired software version.



Upgrading an SX65xx system can take up to 30 minutes during which time the system is indisposed.



The system being upgraded becomes indisposed throughout the upgrade procedure.



The upgrade procedure burns the software image as well as the firmware should there be a need.



If running a system with dual management cards, refer to [Section 4.6.2, “Upgrading MLNX-OS Software on Director Switches,”](#) on page 181.



You have to read and accept the End-User License Agreement (EULA) after image upgrade in case the EULA is modified. The EULA link is only available upon first login to CLI.

To upgrade MLNX-OS software on your system, perform the following steps:

**Step 1.** Change to Config mode.

```
switch > enable
switch # configure terminal
switch (config) #
```

**Step 2.** Obtain the previously available image (.img file). You *must* delete this image in the next step to make room for fetching the new image.

```
switch (config) # show images
Installed images:
```

```
Partition 1:
SX_PPC_M460EX 3.3.3130 2013-03-20 21:32:25 ppc
```

```

Partition 2:
SX_PPC_M460EX 3.3.3130 2013-03-20 21:32:25 ppc

Images available to be installed:

image-PPC_M460EX-SX_3.3.3256.img
SX_PPC_M460EX 3.3.3256 2013-03-20 21:32:25 ppc

Serve image files via HTTP/HTTPS: no

No image install currently in progress.

Boot manager password is set.

No image install currently in progress.

Require trusted signature in image being installed: yes (default)
switch (config) #

```

- Step 3.** Delete the old image (if one exists) that is listed under Images available to be installed prior to fetching the new image. Use the command `image delete` for this purpose.

```

switch (config) # image delete image-PPC_M460EX-3.0.1224.img
switch (config) #

```



When deleting an image, you delete the file but not the partition. This is recommended so as to not overload system resources.

- Step 4.** Fetch the new software image.

```

switch (config) # image fetch scp://username:password@192.168.10.125/var/www/html/
<image_name>
Password (if required): ***** 100.0%[#####]
#####]
switch (config) #

```

- Step 5.** Display the available images.



To recover from image corruption (e.g., due to power interruption), there are two installed images on the system. See the commands:

```

image boot next
image boot location.

```

```

switch (config) # show images
Installed images:
Partition 1:
SX <old ver> 2013-04-28 16:02:50

Partition 2:

```

```

SX <new ver> 2013-04-28 16:52:50

Images available to be installed:
 new_image.img
 SX <new ver> 2013-04-28 16:52:50

Serve image files via HTTP/HTTPS: no

No image install currently in progress.

Boot manager password is set.

No image install currently in progress.

Require trusted signature in image being installed: yes (default)
switch (config) #

```

**Step 6.** Install the new image.

```

switch (config) # image install <image_name>
Step 1 of 4: Verify Image
 100.0% [#####]
Step 2 of 4: Uncompress Image
 100.0% [#####]
Step 3 of 4: Create Filesystems
 100.0% [#####]
Step 4 of 4: Extract Image
 100.0% [#####]
switch (config) #

```



CPU utilization may go up to 100% during image upgrade.

**Step 7.** Have the new image activate during the next boot. Run:

```
switch (config) # image boot next
```

**Step 8.** Run `show images` to review your images. Run:

```

switch (config) # show images
Images available to be installed:
 new_image.img
 SX <new ver> 2011-04-28 16:52:50

Installed images:
 Partition 1:
 SX <old ver> 2011-04-28 16:02:50

 Partition 2:

```

```
SX <new ver> 2011-04-28 16:52:50
```

```
Last boot partition: 1
```

```
Next boot partition: 2
```

```
No boot manager password is set.
```

```
switch (config) #
```

**Step 9.** Save current configuration. Run:

```
switch (config) # configuration write
```

```
switch (config)#
```

**Step 10.** Reboot the switch to run the new image. Run:

```
switch (config) # reload
```

```
Configuration has been modified; save first? [yes] yes
```

```
Configuration changes saved.
```

```
Rebooting...
```

```
switch (config)#
```



After software reboot, the software upgrade will also automatically upgrade the firmware version.



On SX65xx systems with dual management, the software must be upgraded on both the master and the slave modules.



In order to upgrade the system on dual management system refer to [Section 4.6.1, “Upgrading MLNX-OS Software,”](#) on page 178.



When performing upgrade from the WebUI, make sure that the image you are trying to upgrade to is not located already in the system (i.e. fetched from the CLI).

## 4.6.2 Upgrading MLNX-OS Software on Director Switches



Director switches feature dual management modules.

**Step 1.** Identify the chassis HA master. Run:

```
show chassis ha
```

**Step 2.** Upgrade the chassis master according to steps 1-8 in section [Section 4.6.1, on page 178.](#)

Please DO NOT reboot.

**Step 3.** Upgrade the second management module according to steps 1-8 in section [Section 4.6.1](#), on [page 178](#). Please DO NOT reboot.

**Step 4.** Reset the slave management module. In the master management module, run:

```
chassis ha reset other
```

**Step 5.** After invoking the command above, please reboot the master management immediately. Run:

```
reload
```



An alternative for steps 4 and 5 is to power cycle the system.

**Step 6.** Check that 'reset count' equals 0 or 1. Run:

```
show chassis ha
```

If the reset count is not equal to either 0 or 1, power cycle the system.

**Step 7.** Verify all the systems are back online as members of the IB subnet ID. Run:

```
show ib smnodes {brief}
```



Using a director switch (SX65xx) with different software versions on its two management boards is not supported.

When replacing a management board the software running on the replacement board must be aligned with the version of the software running on the other management board.

### 4.6.3 Deleting Unused Images

#### ➤ *To delete unused images:*

**Step 1.** Enter Config mode. Run:

```
switch >
switch > enable
switch # configure terminal
```

**Step 2.** Get a list of the unused images. Run

```
switch (config) # show images
Images available to be installed:
 image-PPC_M460EX-3.1.1224.img
 SX-OS_PPC_M460EX 3.1.1224 2011-04-28 12:29:48 ppc
Installed images:
Partition 1:
SX-OS_PPC_M460EX 3.1.0000-dev-HA 2011-04-10 12:02:49 ppc
Partition 2:
SX-OS_PPC_M460EX 3.1.0000-dev-HA 2011-04-10 12:02:49 ppc

Last boot partition: 1
```

```

Next boot partition: 1
Boot manager password is set.
No image install currently in progress.
Require trusted signature in image being installed: yes
switch (config) #

```

**Step 3.** Delete the unused images. Run:

```

switch (config) # image delete image-PPC_M460EX-3.0.1224.img
switch (config) #

```



When deleting an image, you delete the file but not the partition. This is recommended so as to not overload system resources.

## 4.6.4 Downgrading MLNX-OS Software

Prior to downgrading software, please make sure the following prerequisites are met:

**Step 1.** Log into your switch via the CLI using the console port.

**Step 2.** Backup your configuration according to the following steps:

1. Change to Config mode. Run:

```

switch-112094 [standalone: master] > enable
switch-112094 [standalone: master] # configure terminal
switch-112094 [standalone: master] (config) #

```

2. Disable paging of CLI output. Run:

```

switch-112094 [standalone: master] (config) # no cli default paging enable

```

3. Display commands to recreate current running configuration. Run:

```

switch-112094 [standalone: master] (config) # show running-config

```

4. Copy the output to a text file.

### 4.6.4.1 Downloading Image

**Step 1.** Log into the system to obtain the serial number. Run:

```

switch-112094 [standalone: master] (config) # show inventory

```

**Step 2.** Download the requested MLNX-OS version from the following link:

<http://support.mellanox.com/SupportWeb/>

**Step 3.** Enter your username and password when prompted.

**Step 4.** Log into the switch via the CLI using the console port.

**Step 5.** Change to Config mode. Run:

```

switch > enable
switch # configure terminal
switch (config) #

```

**Step 6.** Delete all previous images from the Images available to be installed prior to fetching the new image. Run:

```

switch (config) # image delete image-EFM_PPC_M405EX-ppc-m405ex 20090531-190132.img

```

**Step 7.** Fetch the requested software image. Run:

```
switch (config) # image fetch scp://username:password@192.168.10.125/var/www/html/
<image_name>
100.0%[#####]
```

#### 4.6.4.2 Downgrading Image



The procedure below assumes that booting and running is done from Partition 1 and the downgrade procedure is performed on Partition 2.

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Show all image files on the system. Run:

```
switch (config) # show images
Images available to be installed:
new_image.img
<downgrade version> 2010-09-19 16:52:50
Installed images:
Partition 1:
<current version> 2010-09-19 03:46:25
Partition 2:
<current version> 2010-09-19 03:46:25
Last boot partition: 1
Next boot partition: 1
No boot manager password is set.
switch (config) #
```

**Step 4.** Install the MLNX-OS image. Run:

```
switch (config) # image install <image_name>
Step 1 of 4: Verify Image
100.0% [#####]
Step 2 of 4: Uncompress Image
100.0% [#####]
Step 3 of 4: Create Filesystems
100.0% [#####]
Step 4 of 4: Extract Image
100.0% [#####]
switch (config) #
```

**Step 5.** Show all image files on the system. Run:

```
switch (config) # show images
Images available to be installed:
new_image.img
<downgrade version> 2010-09-19 16:52:50
```



```

Installed images:
Partition 1:
 <current version> 2010-09-19 03:46:25
Partition 2:
 <downgrade version> 2010-09-19 16:52:50
Last boot partition: 1
Next boot partition: 2
No boot manager password is set.
switch (config) #

```

**Step 6.** Set the boot location to be the other partition (next). Run:

```
switch (config) # image boot next
```



There are two installed images on the system. Therefore, if one of the images gets corrupted (due to power interruption, for example), in the next reboot the image will go up from the second partition.



In case you are downloading to an older software version which has never been run yet on the switch, use the following command sequence as well:

```
switch (config) # no boot next fallback-reboot enable
switch (config) # configuration write
```

**Step 7.** Reload the switch. Run:

```
switch (config) # reload
```

#### 4.6.4.3 Switching to Partition with Older Software Version

The system saves a backup configuration file when upgrading from an older software version to a newer one. If the system returns to the older software partition, it uses this backup configuration file. Note that all configuration changes done with the new software are lost when returning to the older software version.

There are 2 instances where the backup configuration file does not exist:

- The user has run “reset factory” command, which clears all configuration files in the system
- The user has run “configuration switch-to” to a configuration file with different name then the backup file

Also note that the configuration file becomes empty if the switch is downgraded to a software version which has never been installed yet.

To allow switching partition to the older software version, in these cases above, follow the steps below:

**Step 1.** Run the command:

```
switch (config)# no boot next fallback-reboot enable
```

**Step 2.** Set the boot partition. Run:

```
switch (config)# image boot next
```

**Step 3.** Save the configuration. Run:

```
switch (config)# configuration write
```

**Step 4.** Reload the system. Run:

```
switch (config)# reload
```

## 4.6.5 Upgrading System Firmware

Each MLNX-OS software package version has a default switch firmware version. When you update the MLNX-OS software to a new version, an automatic firmware update process will be attempted by MLNX-OS. This process is described below.

### 4.6.5.1 After Updating MLNX-OS Software

Upon rebooting your switch system after updating the MLNX-OS software, MLNX-OS compares its default firmware version with the currently programmed firmware versions on all the switch modules (leafs and spines on director-class switches, or simply the switch card on edge switch systems).

If one or more of the switch modules is programmed with a firmware version other than the default version, then MLNX-OS automatically attempts to burn the default firmware version instead.



If a firmware update takes place, then the login process is delayed a few minutes.

To verify that the firmware update was successful, log into MLNX-OS and run the command “show asic-version” (can be run in any mode). This command lists all of the switch modules along with their firmware versions. Make sure that all the firmware versions are the same and match the default firmware version. If the firmware update failed for one or more modules, then the following warning is displayed.

Some subsystems are not updated with a default firmware.



If you detect a mismatch in firmware version for one or more modules of the switch system, please contact your assigned Mellanox Technologies field application engineer.

#### 4.6.5.2 After Inserting a Switch Spine or Leaf



This section is applicable to director-class switch systems only.

If you insert a switch spine or leaf with a firmware version other than the default version of MLNX-OS, an automatic firmware update process will take place immediately to the inserted module *only*.



The firmware update may take a few minutes. It is recommended not to run any commands until the firmware update completes.



During firmware upgrade internal link status (up/down) notifications may be sent.

To verify that the firmware update was successful, run the command “show asic-version” (can be run in any mode). Check that the firmware version of the inserted switch spine or leaf has the default firmware version.



If you detect a firmware version mismatch for the newly inserted module, please contact your assigned Mellanox Technologies field application engineer.

#### 4.6.5.3 Importing Firmware and Changing the Default Firmware

To perform an automatic firmware update by MLNX-OS for a different switch firmware version without changing the MLNX-OS version, import the firmware package as described below. MLNX-OS sets it as the new default firmware and performs the firmware update automatically as described in the previous subsections.



From version 3.3.4400 and above, the firmware update file format has been changed to mfa format. TGZ format is no longer supported.

##### Default Firmware Change on Standalone Systems

**Step 1.** Import the firmware image (.mfa file). Run:

```
switch (config) # image fetch image fetch scp://root@1.1.1.1:/tmp/fw-SX-rel-9_2_6440-FIT.tgz
Password (if required): *****
100.0% [#####]
switch (config) # image default-chip-fw fw-SX-rel-9_2_6440-FIT.mfa
Installing default firmware image. Please wait...
Default Firmware 9.2.6440 updated. Please save configuration and reboot for new FW to take effect.
switch (config) #
```

**Step 2.** Save the configuration. Run:

```
switch (config) # configuration write
switch (config) #
```

**Step 3.** Reboot the system to enable auto update.

### Default Firmware Change Dual Management Systems

This flow should be implemented on both Orca managements in parallel.

**Step 1.** Import the firmware image (.tgz file) on both management modules.

```
switch (config) # image fetch scp://username:password@10.7.34.115//my_directory/fw-SX-
rel-9_1_6470-FIT.tgz
100.0% [#####]
```

**Step 2.** Change default firmware on the management modules using the command `image default-chip-fw`.

**Step 3.** Verify that both master and slave have successfully installed the new firmware. The following message should be displayed:

```
Default firmware <fw> updated. Please save configuration and reboot for new Fw to take
effect.
```

**Step 4.** Run `configuration write` on both management modules.

**Step 5.** Run `chassis ha reset other` on master only.

**Step 6.** Run `reload` on master only.

## 4.6.6 Commands

This chapter displays all the relevant commands used to manage the system software image.

### image boot

**image boot {location <location ID> | next}**

Specifies the default location where the system should be booted from.

|                           |                                                                      |                                                                                                                                            |
|---------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | location ID                                                          | Specifies the default destination location. There can be up to 2 images on the system. The possible values are 1 or 2.                     |
|                           | next                                                                 | Sets the boot location to be the next once after the one currently booted from, thus avoiding a cycle through all the available locations. |
| <b>Default</b>            | N/A                                                                  |                                                                                                                                            |
| <b>Configuration Mode</b> | enable/config                                                        |                                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                             |                                                                                                                                            |
| <b>Role</b>               | admin                                                                |                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # image boot location 2 switch (config) #</pre> |                                                                                                                                            |
| <b>Related Commands</b>   | show images                                                          |                                                                                                                                            |
| <b>Note</b>               |                                                                      |                                                                                                                                            |

## boot bootmgr password

**boot bootmgr password [<pass-encryption> <password>] [<password>]**  
**no boot bootmgr password**

Specifies a boot manager password.

The no form of the command resets system boot manager password.

|                           |                                                      |                                                                                                                                                                                               |
|---------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | pass-encryption                                      | Possible values: <ul style="list-style-type: none"> <li>0 – specifies a boot manager password in cleartext</li> <li>7 – specifies a boot manager password with an encrypted string</li> </ul> |
|                           | password                                             | Cleartext password                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                  |                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                               |                                                                                                                                                                                               |
| <b>History</b>            | 3.2.0506                                             |                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                |                                                                                                                                                                                               |
| <b>Example</b>            | switch (config) # boot bootmgr password 0 mypassword |                                                                                                                                                                                               |
| <b>Related Commands</b>   |                                                      |                                                                                                                                                                                               |
| <b>Note</b>               |                                                      |                                                                                                                                                                                               |

## boot next

**boot next fallback-reboot enable**  
**no boot next fallback-reboot enable**

Sets the default setting for next boot. Normally, if the system fails to apply the configuration on startup (after attempting upgrades or downgrades, as appropriate), it will reboot to the other partition as a fallback.

The no form of the command tells the system not to do that, only for the next boot.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.2.0506                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | switch (config) # boot next fallback-reboot enable<br>switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Commands</b>   | show images                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Normally, if the system fails to apply the configuration on startup (after attempting upgrades or downgrades, as appropriate) it reboots to the other partition as a fallback.</li> <li>• The no form of this command tells the system not to do that <b>only</b> for the next boot. In other words, this setting is not persistent, and goes back to enabled automatically after each boot.</li> <li>• When downgrading to an older software version which has never been run yet on a system, the “fallback reboot” <b>always</b> happens, unless the command “no boot next fallback-reboot enable” is used. However, this also happens when the older software version <i>has</i> been run before, but the configuration file has been switched since upgrading. In general, a downgrade only works (without having the fallback reboot forcibly disabled) if the process can find a snapshot of the configuration file (by the same name as the currently active one) which was taken before upgrading from the older software version. If that is not found, a fallback reboot is performed in preference to falling back to the initial database because the latter generally involves a loss of network connectivity, and avoiding that is of paramount importance.</li> </ul> |

## boot system

**boot system {location | next}**

**no boot system next**

Configures which system image to boot by default.

The no form of the command resets the next boot location to the current active one.

|                           |                                                                       |                                                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | location                                                              | Specifies location from which to boot system <ul style="list-style-type: none"> <li>• 1 – installs to location 1</li> <li>• 2 – installs to location 2</li> </ul> |
|                           | next                                                                  | Boots system from next location after one currently booted                                                                                                        |
| <b>Default</b>            | N/A                                                                   |                                                                                                                                                                   |
| <b>Configuration Mode</b> | Config                                                                |                                                                                                                                                                   |
| <b>History</b>            | 3.2.0506                                                              |                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                 |                                                                                                                                                                   |
| <b>Example</b>            | <pre>switch (config) # boot system location 2 switch (config) #</pre> |                                                                                                                                                                   |
| <b>Related Commands</b>   | show images                                                           |                                                                                                                                                                   |
| <b>Note</b>               |                                                                       |                                                                                                                                                                   |



## image default-chip-fw

**image default-chip-fw <file name>**

Sets the default firmware package to be installed.

|                           |                                                                                                                          |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                 | Specifies the firmware filename. |
| <b>Default</b>            | N/A                                                                                                                      |                                  |
| <b>Configuration Mode</b> | Config                                                                                                                   |                                  |
| <b>History</b>            | 3.1.0000                                                                                                                 |                                  |
| <b>Role</b>               | admin                                                                                                                    |                                  |
| <b>Example</b>            | <pre>switch (config) # image default-chip-fw image-SX_PPC_M460EX-ppc-m460ex- 20120122-084759.img switch (config) #</pre> |                                  |
| <b>Related Commands</b>   | <pre>image install-chip fw show images</pre>                                                                             |                                  |
| <b>Note</b>               |                                                                                                                          |                                  |

## image delete

**image delete** <image name>

Deletes the specified image file.

|                           |                                                                                         |                           |
|---------------------------|-----------------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | image name                                                                              | Specifies the image name. |
| <b>Default</b>            | N/A                                                                                     |                           |
| <b>Configuration Mode</b> | Config                                                                                  |                           |
| <b>History</b>            | 3.1.0000                                                                                |                           |
| <b>Role</b>               | admin                                                                                   |                           |
| <b>Example</b>            | switch (config) # image delete image-MLXNX-OS-201140526-010145.img<br>switch (config) # |                           |
| <b>Related Commands</b>   | show images                                                                             |                           |
| <b>Note</b>               |                                                                                         |                           |

## image fetch

**image fetch <URL> [<filename>]**

Downloads an image from the specified URL or via SCP.

|                           |                                                                                                                                                                                                                                                                  |                                                                                                                 |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | URL                                                                                                                                                                                                                                                              | HTTP, HTTPS, FTP, TFTP, SCP and SFTP are supported. Example: scp://username[:password]@host-name/path/filename. |
|                           | filename                                                                                                                                                                                                                                                         | Specifies a filename for this image to be stored as locally.                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                              |                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                           |                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                         |                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                            |                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # image fetch scp://&lt;username&gt;@192.168.10.125/var/www/ html/&lt;image_name&gt; Password ***** 100.0%[#####] switch (config) #</pre>                                                                                                   |                                                                                                                 |
| <b>Related Commands</b>   | show images                                                                                                                                                                                                                                                      |                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Please delete the previously available image, prior to fetching the new image</li> <li>• See section “Upgrading MLNX-OS SX Software,” in the <i>Mellanox SwitchX® User Manual</i> for a full upgrade example</li> </ul> |                                                                                                                 |

## image install

**image install** <image filename> [location <location ID>] | [progress <prog-options>] [verify <ver-options>]

Installs the specified image file.

|                           |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | image filename                                                                                                                                                                                                                                                                                    | Specifies the image name.                                                                                                                                                                                                                                                                                                                                                            |
|                           | location ID                                                                                                                                                                                                                                                                                       | Specifies the image destination location.                                                                                                                                                                                                                                                                                                                                            |
|                           | prog-options                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>“no-track” overrides CLI default and does not track the installation progress</li> <li>“track” overrides CLI default and tracks the installation progress</li> </ul>                                                                                                                                                                          |
|                           | ver-options                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>“check-sig” requires an image to have either a valid signature or no signature</li> <li>“ignore-sig” allows unsigned or invalidly signed images to be installed</li> <li>“require-sig” requires from the installed image to have a valid signature. If a valid signature is not found on the image, the image cannot be installed.</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # image install SX_PPC_M460EX 3.0.0000-dev-HA 2012-01-22 08:47:59 ppc Step 1 of 4: Verify Image 100.0% [#####] Step 2 of 4: Uncompress Image 100.0% [#####] Step 3 of 4: Create Filesystems 100.0% [#####] Step 4 of 4: Extract Image 100.0% [#####] switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Commands</b>   | show images                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The image cannot be installed on the “active” location (the one which is currently being booted)</li> <li>On a two-location system, the location is chosen automatically if no location is specified</li> </ul>                                            |                                                                                                                                                                                                                                                                                                                                                                                      |

## image move

**image move** <src image name> <dest image name>

Renames the specified image file.

|                           |                                                                                 |                               |
|---------------------------|---------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | src image name                                                                  | Specifies the old image name. |
|                           | dest image name                                                                 | Specifies the new image name. |
| <b>Default</b>            | N/A                                                                             |                               |
| <b>Configuration Mode</b> | Config                                                                          |                               |
| <b>History</b>            | 3.1.0000                                                                        |                               |
| <b>Role</b>               | admin                                                                           |                               |
| <b>Example</b>            | <pre>switch (config) # image move image1.img image2.img switch (config) #</pre> |                               |
| <b>Related Commands</b>   | show images                                                                     |                               |
| <b>Note</b>               |                                                                                 |                               |

## image options

**image options {require-sig | serve}**

**no image options {require-sig | serve all}**

Configures options and defaults for image usage.

The no form of the command disables options and defaults for image usage.

|                           |                                                                          |                                                                               |
|---------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | require-sig                                                              | Requires images to be signed by a trusted signature                           |
|                           | serve all                                                                | Configures options for serving image files from this appliance                |
|                           | all                                                                      | Makes all image files on this appliance available for HTTP and HTTPS download |
| <b>Default</b>            | N/A                                                                      |                                                                               |
| <b>Configuration Mode</b> | Config                                                                   |                                                                               |
| <b>History</b>            | 3.1.0000                                                                 |                                                                               |
| <b>Role</b>               | admin                                                                    |                                                                               |
| <b>Example</b>            | <pre>switch (config) # image options require-sig switch (config) #</pre> |                                                                               |
| <b>Related Commands</b>   | show images                                                              |                                                                               |
| <b>Note</b>               |                                                                          |                                                                               |

## show bootvar

### show bootvar

Displays the installed system images and the boot parameters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre> switch (config) # show bootvar Installed images:   Partition 1:     SX_PPC_M460EX 3.0.0000-dev-HA 2012-01-22 08:47:59 ppc     Last dobincp: 2012/01/23 14:54:23    Partition 2:     SX_PPC_M460EX 3.0.0000-dev-HA 2012-01-18 09:52:41 ppc     Last dobincp: 2012/01/19 16:48:23  Last boot partition: 1 Next boot partition: 1  Boot manager password is set.  No image install currently in progress.  Image signing: trusted signature always required Admin require signed images: yes  Settings for next boot only:   Fallback reboot on configuration failure: yes (default) switch (config) # </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## show images

### show image

Displays information about the system images and boot parameters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Example</b>            | <pre> switch (config) # show images Images available to be installed:   image-SX_PPC_M460EX-ppc-m460ex-20120122-084759.img   SX_PPC_M460EX 3.0.0000-dev-HA 2012-01-22 08:47:59 ppc  Installed images:   Partition 1:   SX_PPC_M460EX 3.0.0000-dev-HA 2012-01-22 08:47:59 ppc   Last dobincp: 2012/01/23 14:54:23    Partition 2:   SX_PPC_M460EX 3.0.0000-dev-HA 2012-01-18 09:52:41 ppc   Last dobincp: 2012/01/19 16:48:23  Last boot partition: 1 Next boot partition: 1  Boot manager password is set.  No image install currently in progress.  Image signing: trusted signature always required Admin require signed images: yes  Settings for next boot only:   Fallback reboot on configuration failure: yes (default) switch (config) # </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## 4.7 Configuration Management

### 4.7.1 Saving a Configuration File

To save the current configuration to the active configuration file, you can either use the `configuration write` command (requires running in Config mode) or the `write memory` command (requires running in Enable mode).

- To save the configuration to the active configuration file, run:

```
switch (config) # configuration write
```

- To save the configuration to a user-specified file without making the new file the active configuration file, run:

```
switch (config) # configuration write to myconf no-switch
```

- To save the configuration to a user-specified file and make the new file the active configuration file, run:

```
switch (config) # configuration write to myconf
```

- To display the available configuration files and the active file, run:

```
switch (config) # show configuration files
initial
myconf (active)
switch (config) #
```

### 4.7.2 Loading a Configuration File

By default, or after a system reset, the system loads the default “initial” configuration file.

- **To load a different configuration file and make it the active configuration:**

```
switch [standalone: master] >
switch [standalone: master] > enable
switch [standalone: master] # configure terminal
switch [standalone: master] (config) # configuration switch-to myconfig
switch [standalone: master] (config) #
```

On SX65xx systems with dual management modules, load the configuration file according to the following:

- Step 1.** Power cycle the system.
- Step 2.** Load the configuration on the top CPU that serves as the chassis master according to the procedure described above.



If the configuration file is loaded on a different CPU than the SM HA master (SM HA master that serves the VIP), the SM configuration is overwritten.

### 4.7.3 Restoring Factory Default Configuration

In cases where the system configuration becomes corrupted it is suggested to restore the factory default configuration.

➤ **To restore factory default configuration on a single management module system:**

**Step 1.** Run the command `reset factory [reboot] [keep-basic] [keep-all-config]:.`

```
switch (config) # reset factory keep-basic
```

➤ **To restore factory default configuration on a dual management module system:**

If the system configuration ever becomes corrupted it is suggested to restore the factory default configuration.

**Step 1.** Connect to a remote console/serial connection.

**Step 2.** Remove the slave management module.

**Step 3.** Run the command `reset factory [keep-basic] [keep-all-config]:.`

```
switch (config) # reset factory keep-basic
```

Please wait for reboot to complete before moving to the next step.

**Step 4.** Log in as “admin” and start running the Mellanox Configuration Wizard.

**Step 5.** Insert the slave management module.

**Step 6.** Remove the master management module.



A takeover will occur changing the Slave management module role to Master.

**Step 7.** Repeat Step 3 on the new Master management module.

**Step 8.** Insert the other management module. No takeover will occur at this stage.

**Step 9.** Power cycle the system.

### 4.7.4 Managing Configuration Files

There are two types of configuration files that can be applied on the switch, BIN files (binary) and text-based configuration files.

#### 4.7.4.1 BIN Configuration Files

BIN configuration files are not human readable and cannot be edited.

➤ **To create a new BIN configuration file**

```
switch (config) # configuration new my-filename
```

➤ **To upload a BIN configuration file from a switch to an external file server**

```
switch (config) # configuration upload my-filename scp://root@my-server/root/tmp/my-filename
```

➤ **To fetch a BIN configuration file**

```
switch (config) # configuration fetch scp://root@my-server/root/tmp/my-filename
```

➤ **To see the available configuration files**

```
switch (config) # show configuration files
initial (active)
my-filename

Active configuration: initial
Unsaved changes: no
switch (config) #
```

➤ **To load a BIN configuration file:**

```
switch (config) # configuration switch-to my-filename
```



Applying a new BIN configuration file changes the whole switch's configuration and requires system reboot which can be preformed using the command `reload`.

#### 4.7.4.2 Text Configuration Files

Text configuration files are text based and editable.

➤ **To create a new text-based configuration file:**

```
switch (config) # configuration text generate active running save my-filename
```

➤ **To apply a text-based configuration file:**

```
switch (config) # configuration text file my-filename apply
```



Applying a text-based configuration file to an existing/running data port configuration may result in unpredictable behavior. It is therefore suggested to first clear the switch's configuration by applying a specific configuration file (following the procedure in [Section 4.7.4.1](#)) or by resetting the switch back to factory default.

➤ **To upload a text-based configuration file from a switch to an external file server**

```
switch (config) # configuration text file my-filename upload scp://root@my-server/root/
tmp/my-filename
```

➤ **To fetch a text-based configuration file from an external file server to a switch**

```
switch (config) # configuration text fetch scp://root@my-server/root/tmp/my-filename
```

➤ **To apply a text-based configuration file:**

```
switch (config) # configuration text file my-filename apply
```



When applying a text-based configuration file, the configuration is appended to the switch's existing configuration. Reboot is not required.



After applying text-based configuration file, the SM will not be enabled automatically, since the hostname is different. To enable the sm, run the command `ib sm enable`.

## 4.7.5 Commands

### 4.7.5.1 File System

#### debug generate dump

##### debug generate dump

Generates a debug dump.

|                           |                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                     |
| <b>Default</b>            | N/A                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                |
| <b>Role</b>               | admin                                                                                                                   |
| <b>Example</b>            | switch (config) # debug generate dump<br>Generated dump sysdump-switch-112104-201140526-091707.tgz<br>switch (config) # |
| <b>Related Commands</b>   | file debug-dump                                                                                                         |
| <b>Note</b>               | The dump can then be manipulated using the “file debug-dump...” commands.                                               |

## file debug-dump

**file debug-dump {delete {<filename> | latest} | email {<filename> | latest} | upload {{<filename> | latest} <URL>}}**

Manipulates debug dump files.

|                           |                                                                                                        |                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | delete {<filename>   latest}                                                                           | Deletes a debug dump file.                                                                                                                                                             |
|                           | email {<filename>   latest}                                                                            | Emails a debug dump file to pre-configured recipients for “informational events”, regardless of whether they have requested to receive “detailed” notifications or not.                |
|                           | upload {{<filename>   latest} <URL>}}                                                                  | Uploads a debug dump file to a remote host. The URL to the remote host: HTTP, HTTPS, FTP, TFTP, SCP and SFTP are supported. Example: scp://username[:password]@hostname/path/filename. |
| <b>Default</b>            | N/A                                                                                                    |                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                 |                                                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                               | Initial release                                                                                                                                                                        |
|                           | 3.3.4000                                                                                               | Added “latest” parameter                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                  |                                                                                                                                                                                        |
| <b>Example</b>            | switch (config) # file debug-dump email sysdump-switch-112104-20114052-091707.tgz<br>switch (config) # |                                                                                                                                                                                        |
| <b>Related Commands</b>   | show files debug-dump                                                                                  |                                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                        |                                                                                                                                                                                        |

## file stats

**file stats {delete <filename> | move {<source filename> | <destination filename>} | upload <filename> <URL>}**

Manipulates statistics report files.

|                           |                                                                                  |                                                                                                                                                       |
|---------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | delete <filename>                                                                | Deletes a stats report file.                                                                                                                          |
|                           | move <source filename><br><destination filename>                                 | Renames a stats report file.                                                                                                                          |
|                           | upload <filename><br><URL>                                                       | Uploads a stats report file.<br>URL - HTTP, HTTPS, FTP, TFTP, SCP and SFTP are supported. Example: scp://username[:password]@host-name/path/filename. |
| <b>Default</b>            | N/A                                                                              |                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                           |                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                         |                                                                                                                                                       |
| <b>Role</b>               | admin                                                                            |                                                                                                                                                       |
| <b>Example</b>            | switch (config) # file stats move memory-1.csv memory-2.csv<br>switch (config) # |                                                                                                                                                       |
| <b>Related Commands</b>   | show files stats<br>show files stats <filename>                                  |                                                                                                                                                       |
| <b>Note</b>               |                                                                                  |                                                                                                                                                       |

## file tcpdump

**file tcpdump {delete <filename> | upload <filename> <URL>}**

Manipulates tcpdump output files.

|                           |                                                                                |                                                                                                                       |
|---------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | delete <filename>                                                              | Deletes the specified tcpdump output file.                                                                            |
|                           | upload <filename><br><URL>                                                     | Uploads the specified tcpdump output file to the specified URL.                                                       |
|                           |                                                                                | URL - HTTP, HTTPS, FTP, TFTP, SCP and SFTP are supported. Example: scp://username[:password]@host-name/path/filename. |
| <b>Default</b>            | N/A                                                                            |                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                         |                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                       |                                                                                                                       |
| <b>Role</b>               | admin                                                                          |                                                                                                                       |
| <b>Example</b>            | switch (config) # file tcpdump delete my-tcpdump-file.txt<br>switch (config) # |                                                                                                                       |
| <b>Related Commands</b>   | show files stats<br>tcpdump                                                    |                                                                                                                       |
| <b>Note</b>               |                                                                                |                                                                                                                       |

## reload

**reload [force immediate | halt [noconfirm] | noconfirm]**

Reboots or shuts down the system.

|                           |                                                                                                                                               |                                                                      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | force immediate                                                                                                                               | Forces an immediate reboot of the system even if the system is busy. |
|                           | halt                                                                                                                                          | Shuts down the system.                                               |
|                           | noconfirm                                                                                                                                     | Reboots the system without asking about unsaved changes.             |
| <b>Default</b>            | N/A                                                                                                                                           |                                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                        |                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                      |                                                                      |
| <b>Role</b>               | admin                                                                                                                                         |                                                                      |
| <b>Example</b>            | <pre>switch (config) # reload Configuration has been modified; save first? [yes] yes Configuration changes saved. ... switch (config) #</pre> |                                                                      |
| <b>Related Commands</b>   | reset factory                                                                                                                                 |                                                                      |
| <b>Note</b>               |                                                                                                                                               |                                                                      |



## reset factory

**reset factory [keep-all-config | keep-basic | keep-virt-vols | only-config] [halt]**

Clears the system and resets it entirely to its factory state.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | keep-all-cofig                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Preserves everything in the running configuration file. The user will be prompted for confirmation before honoring this command, unless confirmation is disabled with the command: “no cli default prompt confirm-reset”. |
|                           | keep-basic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Preserves licenses in the running configuration file                                                                                                                                                                      |
|                           | keep-virt-vols                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Preserve all virtual disk volumes                                                                                                                                                                                         |
|                           | only-config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Resets only configuration                                                                                                                                                                                                 |
|                           | halt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The system is halted after this process completes                                                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                           |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Added notes and “keep-virt-vols” parameter                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # reset factory Type 'YES' to confirm reset: YES Resetting and rebooting the system -- please wait... ...</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | reload                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                           |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Effects of parameter “keep-all-cofig”: Licenses – not deleted; profile – no change; configuration – unchanged; management IP – unchanged</li> <li>Effects of parameter “keep-basic”: Licenses – not deleted; profile – reset; configuration – reset; management IP – reset</li> <li>Effects of parameter “keep-virt-vols”: Licenses – deleted; profile – reset; configuration – reset; management IP – unchanged</li> <li>Effects of parameter “only-config”: Licenses – deleted; profile – reset; configuration – reset; management IP – unchanged</li> </ul> |                                                                                                                                                                                                                           |

## show files debug-dump

**show files debug-dump [<filename>]**

Displays a list of debug dump files.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                                                                                                                                                                                                                                                                                                                      | Displays a summary of the contents of a particular debug dump file. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                     |
| <b>Example</b>            | <pre>switch (config) # show files debug-dump sysdump-switch-112104-20114052-091707.tgz System information:  Hostname: switch-112104 Version:  SX_PPC 3.1.0000 2011-05-25 13:59:00 ppc Date:      2012-01-26 09:17:07 Uptime:    0d 18h 47m 48s  ===== Output of 'uname -a':  Linux switch-112104 2.6.27-MELLANOXuni-m405ex SX_PPC 3.1.0000 #1 2012-01-25 13:59:00 ppc ppc ppc GNU/Linux  =====  ..... switch (config) #</pre> |                                                                     |
| <b>Related Commands</b>   | file debug-dump                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                     |

## show files stats

**show files stats <filename>**

Displays a list of statistics report files.

|                           |                                                                                        |                                                              |
|---------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | filename                                                                               | Display the contents of a particular statistics report file. |
| <b>Default</b>            | N/A                                                                                    |                                                              |
| <b>Configuration Mode</b> | Config                                                                                 |                                                              |
| <b>History</b>            | 3.1.0000                                                                               |                                                              |
| <b>Role</b>               | admin                                                                                  |                                                              |
| <b>Example</b>            | switch (config) # show files stats<br>memory-201140524-111745.csv<br>switch (config) # |                                                              |
| <b>Related Commands</b>   | file stats                                                                             |                                                              |
| <b>Note</b>               |                                                                                        |                                                              |

## show files system

### show files system [detail]

Displays usage information of the file systems on the system.

| Syntax Description | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Displays more detailed information on file-system. |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |
| Example            | <pre>switch (config) # show files system Statistics for /config filesystem:   Bytes Total      100 MB   Bytes Used       3 MB   Bytes Free       97 MB   Bytes Percent Free 97%   Bytes Available  97 MB   Inodes Total     0   Inodes Used      0   Inodes Free      0   Inodes Percent Free 0%  Statistics for /var filesystem:   Bytes Total      860 MB   Bytes Used       209 MB   Bytes Free       651 MB   Bytes Percent Free 75%   Bytes Available  651 MB   Inodes Total     0   Inodes Used      0   Inodes Free      0   Inodes Percent Free 0% switch (config) #</pre> |                                                    |
| Related Commands   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |

## show files tcpdump

### show files tcpdump

Displays a list of statistics report files.

|                           |                                                                          |
|---------------------------|--------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                      |
| <b>Default</b>            | N/A                                                                      |
| <b>Configuration Mode</b> | Config                                                                   |
| <b>History</b>            | 3.1.0000                                                                 |
| <b>Role</b>               | admin                                                                    |
| <b>Example</b>            | switch (config) # show files stats<br>test<br>dump3<br>switch (config) # |
| <b>Related Commands</b>   | file tcpdump<br>tcpdump                                                  |
| <b>Note</b>               |                                                                          |

## 4.7.5.2 Configuration Files

### configuration audit

**configuration audit max-changes <number>**

Chooses settings related to configuration change auditing.

| Syntax Description | max-changes                                                                                                                                                         | Set maximum number of audit messages to log per change. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Default            | 1000                                                                                                                                                                |                                                         |
| Configuration Mode | Config                                                                                                                                                              |                                                         |
| History            | 3.1.0000                                                                                                                                                            |                                                         |
| Role               | admin                                                                                                                                                               |                                                         |
| Example            | <pre>switch (config) # configuration audit max-changes 100 switch (config) # show configuration audit Maximum number of changes to log: 100 switch (config) #</pre> |                                                         |
| Related Commands   | show configuration                                                                                                                                                  |                                                         |
| Note               | N/A                                                                                                                                                                 |                                                         |

## configuration copy

**configuration copy** <source name> <dest name>

Copies a configuration file.

|                           |                                                                                                                                                                                                                                                                              |                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | source name                                                                                                                                                                                                                                                                  | Name of source file.                                                                                                       |
|                           | dest name                                                                                                                                                                                                                                                                    | Name of destination file. If the file of specified file-name does not exist a new file will be created with said filename. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                          |                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                       |                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                     |                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                        |                                                                                                                            |
| <b>Example</b>            | switch (config) # configuration copy initial.bak example<br>switch (config) #                                                                                                                                                                                                |                                                                                                                            |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                              |                                                                                                                            |
| <b>Note</b>               | <ul style="list-style-type: none"><li>• This command does not affect the current running configuration</li><li>• The active configuration file may not be the target of a copy. However, it may be the source of a copy in which case the original remains active.</li></ul> |                                                                                                                            |

## configuration delete

**configuration delete <filename>**

Deletes a configuration file.

|                           |                                                                                                                                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | filename<br>Name of file to delete.                                                                                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # show configuration files example        initial        initial.bak  initial.prev switch (config) # configuration delete example switch (config) # show configuration files initial        initial.bak    initial.prev switch (config) #</pre> |
| <b>Related Commands</b>   | show configuration                                                                                                                                                                                                                                                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This command does not affect the current running configuration</li> <li>• The active configuration file may not be deleted</li> </ul>                                                                                       |



## configuration fetch

**configuration fetch** <URL> [<name>]

Downloads a configuration file from a remote host.

|                           |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | URL                                                                                                                                                                                                                                                                                                                               | HTTP, HTTPS, FTP, TFTP, SCP and SFTP are supported. Example: scp://username[:password]@host-name/path/filename. |
|                           | name                                                                                                                                                                                                                                                                                                                              | The configuration file name.                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                               |                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                            |                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                          |                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                             |                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # configuration fetch scp://root:password@ 192.168.10.125/tmp/conf1 switch (config) #</pre>                                                                                                                                                                                                                  |                                                                                                                 |
| <b>Related Commands</b>   | configuration switch-to                                                                                                                                                                                                                                                                                                           |                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The downloaded file should not override the active configuration file, using the &lt;name&gt; parameter</li> <li>If no name is specified for a configuration fetch, it is given the same name as it had on the server</li> <li>No configuration file may have the name “active”</li> </ul> |                                                                                                                 |

## configuration jump-start

### configuration jump-start

Runs the initial-configuration wizard.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # configuration jump-start Mellanox configuration wizard Step 1: Hostname? [switch-3cc29c] Step 2: Use DHCP on mgmt0 interface? y Step 3: Admin password (Enter to leave unchanged)? You have entered the following information: 1. Hostname: switch-3cc29c 2. Use DHCP on mgmt0 interface: yes 3. Enable IPv6: yes 4. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: yes 53. Admin password (Enter to leave unchanged): (unchanged) To change an answer, enter the step number to return to. Otherwise hit &lt;enter&gt; to save changes and exit. Choice: Configuration changes saved. switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The wizard is automatically invoked whenever the CLI is launched when the active configuration file is fresh (i.e. not modified from its initial contents)</li> <li>This command invokes the wizard on demand – see chapter “Initializing the Switch for the First Time” in the Mellanox <i>MLNX-OS SwitchX User Manual</i></li> </ul>                                                                                                                                                                                                                                                             |

## configuration merge

### **configuration merge <filename>**

Merges the “shared configuration” from one configuration file into the running configuration.

|                           |                                                                                                                                                                                       |                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                                                                              | Name of file from which to merge settings. |
| <b>Default</b>            | N/A                                                                                                                                                                                   |                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                |                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                              |                                            |
| <b>Role</b>               | admin                                                                                                                                                                                 |                                            |
| <b>Example</b>            | <pre>switch (config) # configuration merge new-config-file switch (config) #</pre>                                                                                                    |                                            |
| <b>Related Commands</b>   |                                                                                                                                                                                       |                                            |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• No configuration files are modified during this process</li> <li>• The configuration name must be a non-active configuration file</li> </ul> |                                            |

## configuration move

**configuration move** <source name> <dest name>

Moves a configuration file.

|                           |                                                                                                                                                                                                                                                                                     |                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | source name                                                                                                                                                                                                                                                                         | Old name of file to move. |
|                           | dest name                                                                                                                                                                                                                                                                           | New name for moved file.  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                 |                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                              |                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                            |                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                               |                           |
| <b>Example</b>            | <pre>switch (config) # show configuration files example1      initial      initial.bak  initial.prev switch (config) # configuration move example1 example2 switch (config) # show configuration files example2      initial      initial.bak  initial.prev switch (config) #</pre> |                           |
| <b>Related Commands</b>   | show configuration                                                                                                                                                                                                                                                                  |                           |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This command does not affect the current running configuration</li> <li>• The active configuration file may not be the target of a move</li> </ul>                                                                                         |                           |

## configuration new

**configuration new <filename> [factory [keep-basic] [keep-connect]]**

Creates a new configuration file under the specified name. The parameters specify what configuration, if any, to carry forward from the current running configuration.

|                           |                                                                                                                                                                                                                                                                    |                                                                               |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                                                                                                                                                           | Names for new configuration file.                                             |
|                           | factory                                                                                                                                                                                                                                                            | Creates new file with only factory defaults.                                  |
|                           | keep-basic                                                                                                                                                                                                                                                         | Keeps licenses and host keys.                                                 |
|                           | keep-connect                                                                                                                                                                                                                                                       | Keeps configuration necessary for connectivity (interfaces, routes, and ARP). |
| <b>Default</b>            | Keeps licenses and host keys                                                                                                                                                                                                                                       |                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                             |                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                           |                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                              |                                                                               |
| <b>Example</b>            | <pre>switch (config) # show configuration files initial          initial.bak  initial.prev switch (config) # configuration new example2 switch (config) # show configuration files example2         initial      initial.bak  initial.prev switch (config) #</pre> |                                                                               |
| <b>Related Commands</b>   | show configuration                                                                                                                                                                                                                                                 |                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                    |                                                                               |

## configuration revert

**configuration revert {factory [keep-basic | keep-connect]| saved}**

Reverts the system configuration to a previous state.

|                           |                                                                           |                                                                               |
|---------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | factory                                                                   | Creates new file with only factory defaults.                                  |
|                           | keep-basic                                                                | Keeps licenses and host keys.                                                 |
|                           | keep-connect                                                              | Keeps configuration necessary for connectivity (interfaces, routes, and ARP). |
|                           | saved                                                                     | Reverts running configuration to last saved configuration.                    |
| <b>Default</b>            | N/A                                                                       |                                                                               |
| <b>Configuration Mode</b> | Config                                                                    |                                                                               |
| <b>History</b>            | 3.1.0000                                                                  |                                                                               |
| <b>Role</b>               | admin                                                                     |                                                                               |
| <b>Example</b>            | <pre>switch (config) # configuration revert saved switch (config) #</pre> |                                                                               |
| <b>Related Commands</b>   | show configuration                                                        |                                                                               |
| <b>Note</b>               | This command is only available when working with an InfiniBand profile.   |                                                                               |

## configuration switch-to

### configuration switch-to <filename>

Loads the configuration from the specified file and makes it the active configuration file.

|                           |                                                                                                                                                                                                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show configuration files initial (active) newcon initial.prev initial.bak switch (config) # configuration switch-to newcon switch (config) # show configuration files initial newcon (active) initial.prev initial.bak switch (config) #</pre> |
| <b>Related Commands</b>   | show configuration files                                                                                                                                                                                                                                              |
| <b>Note</b>               | The current running configuration is lost and not automatically saved to the previous active configuration file.                                                                                                                                                      |

## configuration text fetch

**configuration text fetch** <URL> [**apply** [**discard** | **fail-continue** | **filename** | **overwrite** | **verbose**] | **filename** <filename> | **overwrite** [**apply** | **filename** <filename>]]

Fetches a text configuration file (list of CLI commands) from a specified URL.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <div> <div>apply</div> <div>Applies the file to the running configuration (i.e. executes the commands in it). This option has the following parameters: <ul style="list-style-type: none"> <li>discard: Does not keep downloaded configuration text file after applying it to the system</li> <li>fail-continue: If applying commands, continues execution even if one of them fails</li> <li>overwrite: If saving the file and the filename already exists, replaces the old file</li> <li>verbose: Displays all commands being executed and their output instead of just those that get errors</li> </ul> </div> </div> |
|                           | <div> <div>filename</div> <div>Specifies filename for saving downloaded text file.</div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                           | <div> <div>overwrite</div> <div>Downloads the file and saves it using the same name it had on the server. This option has the following parameters: <ul style="list-style-type: none"> <li>apply: Applies the downloaded configuration to the running system</li> <li>filename: Specifies filename for saving downloaded text file</li> </ul> </div> </div>                                                                                                                                                                                                                                                               |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | <div>3.2.1000</div> <div>First version</div> <div>3.2.3000</div> <div>Updated command</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | switch (config) # configuration fetch text scp://username[:password]@hostname/path/filename                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



## configuration text file

**configuration text file** <filename> {**apply** [**fail-continue**] [**verbose**] | **delete** | **rename** <filename> | **upload** <URL>}

Performs operations on text-based configuration files.

|                           |                                                                                      |                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | filename <file>                                                                      | Specifies the filename.                                                                                                  |
|                           | apply                                                                                | Applies the configuration on the system.                                                                                 |
|                           | fail-continue                                                                        | Continues execution of the commands even if some commands fail.                                                          |
|                           | verbose                                                                              | Displays all commands being executed and their output, instead of just those that get errors.                            |
|                           | delete                                                                               | Deletes the file.                                                                                                        |
|                           | rename <filename>                                                                    | Renames the file.                                                                                                        |
|                           | upload <URL>                                                                         | Supported types are HTTP, HTTPS, FTP, TFTP, SCP and SFTP. For example: scp://username[:password]@hostname/path/filename. |
| <b>Default</b>            | N/A                                                                                  |                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                               |                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                             |                                                                                                                          |
| <b>Role</b>               | admin                                                                                |                                                                                                                          |
| <b>Example</b>            | switch (config) # configuration text file my-config-file delete<br>switch (config) # |                                                                                                                          |
| <b>Related Commands</b>   | show configuration files                                                             |                                                                                                                          |
| <b>Note</b>               |                                                                                      |                                                                                                                          |

## configuration text generate

**configuration text generate** {active {running | saved} | file <filename> } {save <filename> | upload <URL>}

Generates a new text-based configuration file from this system's configuration.

|                           |                                                                                                                                                                                                                                                        |                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | active                                                                                                                                                                                                                                                 | Generates from currently active configuration.                                                                           |
|                           | running                                                                                                                                                                                                                                                | Uses running configuration.                                                                                              |
|                           | saved                                                                                                                                                                                                                                                  | Uses saved configuration.                                                                                                |
|                           | file <filename>                                                                                                                                                                                                                                        | Generates from inactive saved configuration.                                                                             |
|                           | save                                                                                                                                                                                                                                                   | Saves new file to local persistent storage.                                                                              |
|                           | upload <URL>                                                                                                                                                                                                                                           | Supported types are HTTP, HTTPS, FTP, TFTP, SCP and SFTP. For example: scp://username[:password]@hostname/path/filename. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                    |                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                 |                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                               |                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                  |                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # configuration text generate file initial.prev save example switch (config) # show configuration files initial (active) initial.prev initial.bak Active configuration: initial Unsaved changes:      yes switch (config) #</pre> |                                                                                                                          |
| <b>Related Commands</b>   | show configuration files                                                                                                                                                                                                                               |                                                                                                                          |
| <b>Note</b>               |                                                                                                                                                                                                                                                        |                                                                                                                          |

## configuration upload

**configuration upload {active | <name>} <URL or scp or sftp://username:password@hostname[:port]/path/filename>**

Uploads a configuration file to a remote host.

|                           |                                                                                                                          |                                       |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Syntax Description</b> | active                                                                                                                   | Upload the active configuration file. |
| <b>Default</b>            | N/A                                                                                                                      |                                       |
| <b>Configuration Mode</b> | Config                                                                                                                   |                                       |
| <b>History</b>            | 3.1.0000                                                                                                                 |                                       |
| <b>Role</b>               | admin                                                                                                                    |                                       |
| <b>Example</b>            | <pre>switch (config) # configuration upload active scp://root:password@ 192.168.10.125/tmp/conf1 switch (config) #</pre> |                                       |
| <b>Related Commands</b>   | N/A                                                                                                                      |                                       |
| <b>Note</b>               | No configuration file may have the name “active”.                                                                        |                                       |

## configuration write

**configuration write [local | to <filename> [no-switch]]**

Saves the running configuration to the active configuration file.

|                           |                                                                    |                                                                                                   |
|---------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | local                                                              | Saves the running configuration locally (same as “write memory local”)                            |
|                           | to <filename>                                                      | Saves the running configuration to a new file under a different name and makes it the active file |
|                           | no-switch                                                          | Saves the running configuration to this file but keep the current one active                      |
| <b>Default</b>            | N/A                                                                |                                                                                                   |
| <b>Configuration Mode</b> | Config                                                             |                                                                                                   |
| <b>History</b>            | 3.1.0000                                                           |                                                                                                   |
| <b>Role</b>               | admin                                                              |                                                                                                   |
| <b>Example</b>            | <pre>switch (config) # configuration write switch (config) #</pre> |                                                                                                   |
| <b>Related Commands</b>   | write                                                              |                                                                                                   |
| <b>Note</b>               |                                                                    |                                                                                                   |

## write

### write {memory [local] | terminal}

Saves or displays the running configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | memory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Saves running configuration to the active configuration file. It is the same as “configuration write”. |
|                           | local                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Saves the running configuration only on the local node. It is the same as “configuration write local”. |
|                           | terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays commands to recreate current running configuration. It is the same as “show running-config”.  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                        |
| <b>Example</b>            | <pre> switch (config) # write terminal ## ## Running database "initial" ## Generated at 20114/05/27 10:05:16 +0000 ## Hostname: switch ## ## ## Network interface configuration ## interface mgmt0 comment "" interface mgmt0 create interface mgmt0 dhcp interface mgmt0 display interface mgmt0 duplex auto interface mgmt0 mtu 1500 no interface mgmt0 shutdown interface mgmt0 speed auto no interface mgmt0 zeroconf ## ## Local user account configuration ## username a** capability admin no username a** disable username a** disable password ..... switch (config) # </pre> |                                                                                                        |
| <b>Related Commands</b>   | <pre> show running-config configuration write </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                        |

## show configuration

**show configuration [audit | files [<filename>] | running | text files]**

Displays a list of CLI commands that will bring the state of a fresh system up to match the current persistent state of this system.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | audit                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Displays settings for configuration change auditing.                                                                                                                                                                                                                                                |
|                           | files [<filename>]                                                                                                                                                                                                                                                                                                                                                                                                                                              | Displays a list of configuration files in persistent storage if no filename is specified. If a filename is specified, it displays the commands to recreate the configuration in that file. In the latter case, only non-default commands are shown, as for the normal “show configuration” command. |
|                           | running                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Displays commands to recreate current running configuration. Same as “show configuration” except that it applies to the currently running configuration, rather than the current persisted configuration.                                                                                           |
|                           | text files                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Displays names of available text-based configuration files.                                                                                                                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                     |
|                           | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Removed “running full” and “full” parameters                                                                                                                                                                                                                                                        |
| <b>Role</b>               | monitor/admin                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show configuration ## ## Active saved database "newcon" ## Generated at 20114/05/25 10:18:52 +0000 ## Hostname: switch-3cc29c ## ## ## Network interface configuration ## interface mgmt0 comment "" interface mgmt0 create interface mgmt0 dhcp interface mgmt0 display interface mgmt0 duplex auto interface mgmt0 mtu 1500 no interface mgmt0 shutdown interface mgmt0 speed auto no interface mgmt0 zeroconf switch (config) #</pre> |                                                                                                                                                                                                                                                                                                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                     |

## show running-config

### show running-config

Displays commands to recreate current running configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                           | 3.3.4402                      Removed “full” parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | monitor/admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre> switch (config) # show running-config ## ## Running database "initial" ## Generated at 2012/02/28 14:59:02 +0000 ## Hostname: switch-5ea5d8 ##  ## ## License keys ##     license install LK2-EFM_SX-5M11-5K11-5HGL-0KAL-64QK-8C2Q-60Q3-6C1G  ## ## Network interface configuration ##     interface mgmt0 create     interface mgmt0 comment ""     interface mgmt0 dhcp     interface mgmt0 display     interface mgmt0 duplex auto     interface mgmt0 mtu 1500 no interface mgmt0 shutdown ... switch (config) # </pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## 4.8 Logging

### 4.8.1 Monitor

➤ **To print logging events to the terminal:**

Set the modules or events you wish to print to the terminal. For example, run:

```
switch (config) # logging monitor events notice
switch (config) # logging monitor sx-sdk warning
```

These commands print system events in severity “notice” and sx-sdk module notifications in severity “warning” to the screen. For example, in case of interface-down event, the following gets printed to the screen.

```
switch (config) #
Wed Jul 10 11:30:42 2013: Interface IB1/17 changed state to DOWN
Wed Jul 10 11:30:43 2013: Interface IB1/18 changed state to DOWN
switch (config) #
```

To see a list of the events, refer to [Table 27, “Supported Event Notifications and MIB Mapping,” on page 271](#).

### 4.8.2 Remote Logging

➤ **To configure remote syslog to send syslog messages to a remote syslog server:**

**Step 1.** Enter Config mode. Run:

```
switch >
switch > enable
switch # configure terminal
```

**Step 2.** Set remote syslog server. Run

```
switch (config) # logging <IP address>
```

**Step 3.** Set the minimum severity of the log level to info. Run:

```
switch (config) # logging <IP address> trap info
```

**Step 4.** Override the log levels on a per-class basis. Run:

```
switch (config) # logging <IP address> trap override class <class name> priority <level>
```



### 4.8.3 Commands

#### logging <syslog IP address>

**logging <syslog IP address> [trap {<log-level> | override class <class> priority <log-level>}]**

**no logging <syslog IP address> [trap {<log-level> | override class <class> priority <log-level>}]**

Enables (by setting the IP address) sending logging messages, with ability to filter the logging messages according to their classes.

The no form of the command stops sending messages to the remote syslog server.

| Syntax Description        | syslog IP address          | IPv4 address of the remote syslog server.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | log-level                  | <ul style="list-style-type: none"> <li>• alert - alert notification, action must be taken immediately</li> <li>• crit - critical condition</li> <li>• debug - debug level messages</li> <li>• emerg - system is unusable (emergency)</li> <li>• err - error condition</li> <li>• info - informational condition</li> <li>• none - disables the logging locally and remotely</li> <li>• notice - normal, but significant condition</li> <li>• warning - warning condition</li> </ul>                                                                                                                                                                                                                  |
|                           | class                      | <p>Sets or removes a per-class override on the logging level. All classes which do not have an override set will use the global logging level set with “logging local &lt;log level&gt;”. Classes that do have an override will do as the override specifies. If “none” is specified for the log level, MLNX-OS will not log anything from this class.</p> <p>Classes available:</p> <ul style="list-style-type: none"> <li>• iss-modules - protocol stack</li> <li>• mgmt-back - system management back-end</li> <li>• mgmt-core - system management core</li> <li>• mgmt-front - system management front-end</li> <li>• mlx-daemons - management daemons</li> <li>• sx-sdk - switch SDK</li> </ul> |
|                           | log-level                  | <ul style="list-style-type: none"> <li>• alert - alert notification, action must be taken immediately</li> <li>• crit - critical condition</li> <li>• debug - debug level messages</li> <li>• emerg - system is unusable (emergency)</li> <li>• err - error condition</li> <li>• info - informational condition</li> <li>• none - disables the logging locally and remotely</li> <li>• notice - normal, but significant condition</li> <li>• warning - warning condition</li> </ul>                                                                                                                                                                                                                  |
| <b>Default</b>            | Remote logging is disabled |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Config                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

---

**Example**

```
switch (config) # logging local info
switch (config) # show logging
Local logging level: info
Default remote logging level: notice
No remote syslog servers configured.
Allow receiving of messages from remote hosts: no
Number of archived log files to keep: 10
Log rotation size threshold: 5.000% of partition (43 megabytes)
Log format: standard
Subsecond timestamp field: disabled
Levels at which messages are logged:
 CLI commands: notice
 Audit messages: notice
switch (config) #
```

---

**Related Commands**

```
show logging
logging local override
```

---

**Note**

---

## logging debug-files

**logging debug-files {delete {current | oldest} | rotation {criteria | force | max-num} | update {<number> | current} | upload <log-file> <upload URL>}**

Configures settings for debug log files.

|                           |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | delete {current   oldest}                                                                                          | Deletes certain debug-log files. <ul style="list-style-type: none"> <li>current: Deletes the current active debug-log file</li> <li>oldest: Deletes some of the oldest debug-log files</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                           |
|                           | rotation {criteria {frequency {daily   weekly   monthly}   size <size>   size-pct <percentage>}   force   max-num} | Configures automatic rotation of debug-logging files. <ul style="list-style-type: none"> <li>criteria: Sets how the system decides when to rotate debug files. <ul style="list-style-type: none"> <li>frequency: Rotate log files on a fixed time-based schedule</li> <li>size: Rotate log files when they pass a size threshold in megabytes</li> <li>size-pct: Rotate logs when they surpass a specified percentage of disk</li> </ul> </li> <li>forces: Forces an immediate rotation of the log files</li> <li>max-num: Specifies the maximum number of old log files to keep</li> </ul> |
|                           | update {<number>   current}                                                                                        | Uploads a local debug-log file to a remote host. <ul style="list-style-type: none"> <li>current: Uploads log file “messages” to a remote host</li> <li>number: Uploads compressed log file “debug.&lt;number&gt;.gz” to a remote host. Range is 1-10</li> </ul>                                                                                                                                                                                                                                                                                                                             |
|                           | upload                                                                                                             | Uploads debug log file to a remote host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                           | log-file                                                                                                           | Possible values: 1-7, or current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                           | upload URL                                                                                                         | HTTP, HTTPS, FTP, TFTP, SCP and SFTP are supported (e.g.: scp://username[:password]@hostname/path/filename)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>History</b>            | 3.3.4150                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # logging debug-files delete current switch (config) #</pre>                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Commands</b>   |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## logging local override

**logging local override [class <class> priority <log-level>]**

**no logging local override [class <class> priority <log-level>]**

Enables class-specific overrides to the local log level.

The no form of the command disables all class-specific overrides to the local log level without deleting them from the configuration, but disables them so that the logging level for all classes is determined solely by the global setting.

|                           |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | override              | Enables class-specific overrides to the local log level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                           | class                 | <p>Sets or removes a per-class override on the logging level. All classes which do not have an override set will use the global logging level set with “logging local &lt;log level&gt;”. Classes that do have an override will do as the override specifies. If “none” is specified for the log level, MLNX-OS will not log anything from this class.</p> <p>Classes available:</p> <ul style="list-style-type: none"> <li>• debug-module - debug module functionality</li> <li>• protocol-stack - protocol stack modules functionality</li> <li>• mgmt-back - system management back-end components</li> <li>• mgmt-core - system management core</li> <li>• mgmt-front - system management front-end components</li> <li>• mlx-daemons - management daemons</li> <li>• sx-sdk - switch SDK</li> </ul> |
|                           | log-level             | <ul style="list-style-type: none"> <li>• alert - alert notification, action must be taken immediately</li> <li>• crit - critical condition</li> <li>• debug - debug level messages</li> <li>• emerg - system is unusable (emergency)</li> <li>• err - error condition</li> <li>• info - informational condition</li> <li>• none - disables the logging locally and remotely</li> <li>• notice - normal, but significant condition</li> <li>• warning - warning condition</li> </ul>                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | Override is disabled. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                           | 3.3.4150              | <p>Added debug-module class</p> <p>Changed iss-modules with protocol-stack</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

---

**Example**

```
switch (config) # logging local override class mgmt-front priority
warning
switch (config) # show logging
Local logging level: info
 Override for class mgmt-front: warning
Default remote logging level: notice
No remote syslog servers configured.
Allow receiving of messages from remote hosts: no
Number of archived log files to keep: 10
Log rotation size threshold: 5.000% of partition (43 megabytes)
Log format: standard
Subsecond timestamp field: disabled
Levels at which messages are logged:
 CLI commands: notice
 Audit messages: notice
switch (config) #
```

---

**Related Commands**

```
show logging
logging local
```

---

**Note**

---

## logging fields

**logging fields seconds {enable | fractional-digits <f-digit> | whole-digits <w-digit>}**

**no logging fields seconds {enable | fractional-digits <f-digit> | whole-digits <w-digit>}**

Specifies whether to include an additional field in each log message that shows the number of seconds since the Epoch or not.

The no form of the command disallows including an additional field in each log message that shows the number of seconds since the Epoch.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Specifies whether to include an additional field in each log message that shows the number of seconds since the Epoch or not.                                                                                                                          |
|                           | f-digit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The fractional-digits parameter controls the number of digits to the right of the decimal point. Truncation is done from the right.<br>Possible values are: 1, 2, 3, or 6.                                                                             |
|                           | w-digit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The whole-digits parameter controls the number of digits to the left of the decimal point. Truncation is done from the left. Except for the year, all of these digits are redundant with syslog's own date and time.<br>Possible values: 1, 6, or all. |
| <b>Default</b>            | disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                        |
| <b>Example</b>            | <pre> switch (config) # logging fields seconds enable switch (config) # logging fields seconds whole-digits 1 switch (config) # show logging Local logging level: info   Override for class mgmt-front: warning Default remote logging level: notice No remote syslog servers configured. Allow receiving of messages from remote hosts: no Number of archived log files to keep: 10 Log rotation size threshold: 5.000% of partition (43 megabytes) Log format: standard Subsecond timestamp field: enabled Subsecond timestamp precision: 1 whole digit; 3 fractional digits Levels at which messages are logged:   CLI commands: notice   Audit messages: notice switch (config) #           </pre> |                                                                                                                                                                                                                                                        |

---

|                         |              |
|-------------------------|--------------|
| <b>Related Commands</b> | show logging |
|-------------------------|--------------|

|             |                                                                                                                                                                                                                                      |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | This is independent of the standard syslog date and time at the beginning of each message in the format of “July 15 18:00:00”. Aside from indicating the year at full precision, its main purpose is to provide subsecond precision. |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

---

## logging files delete

**logging files delete {current | oldest [<number of files>]}**

Deletes the current or oldest log files.

|                           |                                                                             |                                         |
|---------------------------|-----------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | current                                                                     | Deletes current log file.               |
|                           | oldest                                                                      | Deletes oldest log file.                |
|                           | number of files                                                             | Sets the number of files to be deleted. |
| <b>Default</b>            | CLI commands and audit message are set to notice logging level              |                                         |
| <b>Configuration Mode</b> | Config                                                                      |                                         |
| <b>History</b>            | 3.1.0000                                                                    |                                         |
| <b>Role</b>               | admin                                                                       |                                         |
| <b>Example</b>            | <pre>switch (config) # logging files delete current switch (config) #</pre> |                                         |
| <b>Related Commands</b>   | <pre>show logging show log files</pre>                                      |                                         |
| <b>Note</b>               |                                                                             |                                         |



## logging files rotation

**logging files rotation** {criteria { frequency <freq> | size <size-mb>| size-pct <size-percentage>} | force | max-number <number-of-files>}

Sets the rotation criteria of the logging files.

|                           |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | freq                                                                                | Sets rotation criteria according to time. Possible options are: <ul style="list-style-type: none"> <li>• Daily</li> <li>• Weekly</li> <li>• Monthly</li> </ul>                                                                                                                                                                                                             |
|                           | size-mb                                                                             | Sets rotation criteria according to size in mega bytes. The range is 1-9999.                                                                                                                                                                                                                                                                                               |
|                           | size-percentage                                                                     | Sets rotation criteria according to size in percentage of the partition where the logging files are kept in. The percentage given is truncated to three decimal points (thousandths of a percent).                                                                                                                                                                         |
|                           | force                                                                               | Forces an immediate rotation of the log files. This does not affect the schedule of auto-rotation if it was done based on time: the next automatic rotation will still occur at the same time for which it was previously scheduled. Naturally, if the auto-rotation was based on size, this will delay it somewhat as it reduces the size of the active log file to zero. |
|                           | number-of-files                                                                     | The number of log files will be kept. If the number of log files ever exceeds this number (either at rotation time, or when this setting is lowered), the system will delete as many files as necessary to bring it down to this number, starting with the oldest.                                                                                                         |
| <b>Default</b>            | 10 files are kept by default with rotation criteria of 5% of the log partition size |                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                              |                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                            |                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                               |                                                                                                                                                                                                                                                                                                                                                                            |

---

**Example**

```
switch (config) # logging files rotation criteria size-pct 6
switch (config) # show logging
Local logging level: info
 Override for class mgmt-front: warning
Default remote logging level: notice
No remote syslog servers configured.
Allow receiving of messages from remote hosts: no
Number of archived log files to keep: 10
Log rotation size threshold: 6.000% of partition (51.60 megabytes)
Log format: standard
Subsecond timestamp field: enabled
Subsecond timestamp precision: 1 whole digit; 3 fractional digits
Levels at which messages are logged:
 CLI commands: info
 Audit messages: notice
switch (config)
```

---

**Related Commands**

```
show logging
show log files
```

---

**Note**

---

## logging files upload

**logging files upload {current | <file-number>} <url>**

Uploads a log file to a remote host.

|                           |                                                                                     |                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | current                                                                             | The current log file.<br>The current log file will have the name “messages” if you do not specify a new name for it in the upload URL.                                                                              |
|                           | file-number                                                                         | An archived log file.<br>The archived log file will have the name “messages<n>.gz” (while “n” is the file number) if you do not specify a new name for it in the upload URL. The file will be compressed with gzip. |
|                           | url                                                                                 | Uploads URL path.<br>FTP, TFTP, SCP, and SFTP are supported. For example: scp://username[:password]@hostname/path/file-name.                                                                                        |
| <b>Default</b>            | 10 files are kept by default with rotation criteria of 5% of the log partition size |                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                              |                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                            |                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                               |                                                                                                                                                                                                                     |
| <b>Example</b>            | switch (config) # logging files uplaod 1 scp://admin@scpserver                      |                                                                                                                                                                                                                     |
| <b>Related Commands</b>   | show logging<br>show log files                                                      |                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                     |                                                                                                                                                                                                                     |

## logging format

**logging format {standard | welf [fw-name <hostname>]}**  
**no logging format {standard | welf [fw-name <hostname>]}**

Sets the format of the logging messages.  
 The no form of the command resets the format to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Standard format.                                                                                                                                                |
|                           | welf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | WebTrends Enhanced Log file (WELF) format.                                                                                                                      |
|                           | hostname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Specifies the firewall hostname that should be associated with each message logged in WELF format. If no firewall name is set, the hostname is used by default. |
| <b>Default</b>            | standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # logging format standard switch (config) # show logging Local logging level: info Default remote logging level: notice No remote syslog servers configured. Allow receiving of messages from remote hosts: yes Number of archived log files to keep: 10 Log rotation size threshold: 5.000% of partition (43 megabytes) Log format: standard Subsecond timestamp field: disabled Levels at which messages are logged:   CLI commands: notice   Audit messages: notice switch (config) #</pre> |                                                                                                                                                                 |
| <b>Related Commands</b>   | show logging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                 |

## logging level

**logging level {cli commands <log-level> | audit mgmt <log-level>}**

Sets the severity level at which CLI commands or the management audit message that the user executes are logged. This includes auditing of both configuration changes and actions.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | cli commands                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Sets the severity level at which CLI commands which the user executes are logged.                                                                                                                                                                                                                                                                                                                                                                                                   |
|                           | audit mgmt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sets the severity level at which all network management audit messages are logged.                                                                                                                                                                                                                                                                                                                                                                                                  |
|                           | log-level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• alert - alert notification, action must be taken immediately</li> <li>• crit - critical condition</li> <li>• debug - debug level messages</li> <li>• emerg - system is unusable (emergency)</li> <li>• err - error condition</li> <li>• info - informational condition</li> <li>• none - disables the logging locally and remotely</li> <li>• notice - normal, but significant condition</li> <li>• warning - warning condition</li> </ul> |
| <b>Default</b>            | CLI commands and audit message are set to notice logging level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # logging level cli commands info switch (config) # show logging Local logging level: info   Override for class mgmt-front: warning Default remote logging level: notice No remote syslog servers configured. Allow receiving of messages from remote hosts: no Number of archived log files to keep: 10 Log rotation size threshold: 5.000% of partition (43 megabytes) Log format: standard Subsecond timestamp field: enabled Subsecond timestamp precision: 1 whole digit; 3 fractional digits Levels at which messages are logged:   CLI commands: info   Audit messages: notice switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Commands</b>   | show logging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## logging monitor

**logging monitor** <facility> <priority-level>  
**no logging monitor** <facility> <priority-level>

Sets monitor log facility and level to print to the terminal.  
 The no form of the command disables printing logs of facilities to the terminal.

|                           |                                                                              |                                                                                                                                                                                                 |
|---------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | facility                                                                     | <ul style="list-style-type: none"> <li>• mgmt-front</li> <li>• mgmt-back</li> <li>• mgmt-core</li> <li>• events</li> <li>• sx-sdk</li> <li>• mlnx-daemons</li> <li>• iss-modules</li> </ul>     |
|                           | priority-level                                                               | <ul style="list-style-type: none"> <li>• none</li> <li>• emerg</li> <li>• alert</li> <li>• crit</li> <li>• err</li> <li>• warning</li> <li>• notice</li> <li>• info</li> <li>• debug</li> </ul> |
| <b>Default</b>            | no logging monitor                                                           |                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                       |                                                                                                                                                                                                 |
| <b>History</b>            | 3.3.4000                                                                     |                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                        |                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # logging monitor events notice switch (config) #</pre> |                                                                                                                                                                                                 |
| <b>Related Commands</b>   |                                                                              |                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                              |                                                                                                                                                                                                 |

## logging receive

**logging receive**  
**no logging receive**

Enables receiving logging messages from a remote host.  
 The no form of the command disables the option of receiving logging messages from a remote host.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | Receiving logging is disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch (config) # logging receive switch (config) # show logging Local logging level: info Default remote logging level: notice No remote syslog servers configured. Allow receiving of messages from remote hosts: yes Number of archived log files to keep: 10 Log rotation size threshold: 5.000% of partition (43 megabytes) Log format: standard Subsecond timestamp field: disabled Levels at which messages are logged:   CLI commands: notice   Audit messages: notice switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>show logging logging local logging local override</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This does not log to the console TTY port</li> <li>• In-band management should be enabled in order to open a channel from the host to the CPU</li> <li>• If enabled, only log messages matching or exceeding the minimum severity specified with the “logging local” command will be logged, regardless of what is sent from the remote host</li> </ul>                                                                                                            |

## logging trap

**logging trap**  
**no logging trap**

Configures the minimum severity of log messages sent to syslog servers.  
 The no form of the command disables sending event log messages to syslog servers.

|                           |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | severity level                                                   | <p>The minimum severity level for all configured syslog servers:</p> <ul style="list-style-type: none"> <li>• none – disable logging</li> <li>• emerg – emergency: system is unusable</li> <li>• alert – action must be taken immediately</li> <li>• crit – critical conditions</li> <li>• err – error conditions</li> <li>• warning – warning conditions</li> <li>• notice – normal but significant condition</li> <li>• info – informational messages</li> <li>• debug – debug-level messages</li> </ul> |
| <b>Default</b>            | Receiving logging is disabled                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # logging trap info switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Commands</b>   |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



## show logging

### show logging

Displays the logging configurations.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # show logging Local logging level: info   Override for class mgmt-front: warning Default remote logging level: notice No remote syslog servers configured. Allow receiving of messages from remote hosts: no Number of archived log files to keep: 10 Log rotation size threshold: 5.000% of partition (43 megabytes) Log format: standard Subsecond timestamp field: enabled Subsecond timestamp precision: 1 whole digit; 3 fractional digits Levels at which messages are logged:   CLI commands: info   Audit messages: notice switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>logging fields logging files rotation logging level logging local logging receive logging &lt;syslog IP address&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## show log

**show log [continues | files [<file-number>]] [[not] matching <reg-exp>]**

Displays the log file with optional filter criteria.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | continues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Displays the last few lines of the current log file and then continues to display new lines as they come in until the user hits Ctrl+C, similar to LINUX “tail” utility. |
|                           | files                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Displays the list of log files.                                                                                                                                          |
|                           | <file-number>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays an archived log file, where the number may range from 1 up to the number of archived log files available.                                                       |
|                           | [not] matching <reg-exp>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The file is piped through a LINUX “grep” utility to only include lines either matching, or not matching, the provided regular expression.                                |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                          |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                          |
|                           | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Updated example and added note                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show log matching "Executing Action" Jan 19 10:55:38 arc-switch14 cli28202: [cli.NOTICE]: user admin: Executing command: en Jan 19 11:19:32 arc-switch14 cli28202: [cli.NOTICE]: user admin: Executing command: image install image-SX_PPC_M460EX-ppc-m460ex-20140119-115026.img Jan 19 11:19:32 arc-switch14 mgmtd4064: [mgmtd.NOTICE]: Action ID 326: requested by: user admin (System Administrator) via CLI Jan 19 11:19:32 arc-switch14 mgmtd4064: [mgmtd.NOTICE]: Action ID 326: descr: install system software image Jan 19 11:19:32 arc-switch14 mgmtd4064: [mgmtd.NOTICE]: Action ID 326: param: image file- name: image-SX_PPC_M460EX-ppc-m460ex-20140119-115026.img, version: SX_PPC_M460EX 3.0.0000-dev-master-HA 2014-01-19 11:50:26 ppc Jan 19 11:19:32 arc-switch14 mgmtd4064: [mgmtd.NOTICE]: Action ID 326: param: switch next boot location after install: no switch (config) #</pre> |                                                                                                                                                                          |
| <b>Related Commands</b>   | logging fields<br>logging files rotation<br>logging level<br>logging local<br>logging receive<br>logging <syslog IP address><br>show logging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                          |
| <b>Note</b>               | When using a regular expression containing   (OR), the expression should be surrounded by quotes (“<expression>”), otherwise it is parsed as filter (PIPE) command.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                          |

## 4.9 Debugging

➤ *To use the debugging logs feature:*

**Step 1.** Enable debugging. Run:

```
switch (config) # debug ethernet all
```

**Step 2.** Display the debug level set. Run:

```
switch (config) # show debug ethernet
```

**Step 3.** Display the logs. Run:

```
switch (config) # show log debug {match|continue}
```

## 4.9.1 Commands

### debug ethernet all

**debug ethernet all**  
**no debug ethernet all**

Enables debug traces for Ethernet modules.  
The no form of the command disables the debug traces for all Ethernet modules.

|                           |                                                           |
|---------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                       |
| <b>Default</b>            | N/A                                                       |
| <b>Configuration Mode</b> | Config                                                    |
| <b>History</b>            | 3.3.4150                                                  |
| <b>Role</b>               | admin                                                     |
| <b>Example</b>            | switch (config) # debug ethernet all<br>switch (config) # |
| <b>Related Commands</b>   |                                                           |
| <b>Note</b>               |                                                           |

## debug ethernet dcbx

**debug ethernet dcbx {all | management | fail-all | control-panel | tlv}**

Configures the trace level for DCBX.

The no form of the command disables the configured DCBX debug traces.

|                           |                                                                        |                                  |
|---------------------------|------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | all                                                                    | Enables all traces.              |
|                           | management                                                             | Management messages.             |
|                           | fail-all                                                               | All failure traces.              |
|                           | control-panel                                                          | Control plane traces.            |
|                           | tlv                                                                    | TLV related trace configuration. |
| <b>Default</b>            | N/A                                                                    |                                  |
| <b>Configuration Mode</b> | Config                                                                 |                                  |
| <b>History</b>            | 3.3.4150                                                               |                                  |
| <b>Role</b>               | admin                                                                  |                                  |
| <b>Example</b>            | <pre>switch (config) # debug ethernet dcbx all switch (config) #</pre> |                                  |
| <b>Related Commands</b>   |                                                                        |                                  |
| <b>Note</b>               |                                                                        |                                  |

## debug ethernet ip all

### debug ethernet ip all

Enables debug traces for all routing modules.

The no form of the command disables debug traces for all routing modules.

|                           |                                                              |
|---------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                          |
| <b>Default</b>            | N/A                                                          |
| <b>Configuration Mode</b> | Config                                                       |
| <b>History</b>            | 3.3.4150                                                     |
| <b>Role</b>               | admin                                                        |
| <b>Example</b>            | switch (config) # debug ethernet ip all<br>switch (config) # |
| <b>Related Commands</b>   |                                                              |
| <b>Note</b>               |                                                              |

## debug ethernet ip arp all

**debug ethernet ip arp all**  
**no debug ethernet ip arp all**

Enables the trace level for ARP.  
The no form of the command disables the trace level for ARP.

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                              |
| <b>Default</b>            | N/A                                                              |
| <b>Configuration Mode</b> | Config                                                           |
| <b>History</b>            | 3.3.4150                                                         |
| <b>Role</b>               | admin                                                            |
| <b>Example</b>            | switch (config) # debug ethernet ip arp all<br>switch (config) # |
| <b>Related Commands</b>   |                                                                  |
| <b>Note</b>               |                                                                  |

## debug ethernet ip bgp

**debug ethernet ip bgp {all | control-path | dampening | graceful-restart | internal | keep-alive | receive | resources | rtm | transmit | update}**

**no debug ethernet ip bgp {all | control-path | dampening | graceful-restart | internal | keep-alive | receive | resources | rtm | transmit | update}**

Enables the trace level for BGP.

The no form of the command disables tracking a specified level.

|                           |                                                                          |                                      |
|---------------------------|--------------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | all                                                                      | Enable track traces                  |
|                           | control-path                                                             | Control path dump trace              |
|                           | dampening                                                                | Dampening information                |
|                           | graceful-restart                                                         | Graceful-restart events              |
|                           | internal                                                                 | Internal events                      |
|                           | keep-alive                                                               | Keep-alive packets exchange          |
|                           | neighbor                                                                 | Peer connection/state changes traces |
|                           | receive                                                                  | All received packets                 |
|                           | resources                                                                | OS Resource trace                    |
|                           | rtm                                                                      | Route change notifications           |
|                           | transmit                                                                 | All transmitted packets              |
|                           | update                                                                   | Update packets exchange              |
| <b>Default</b>            | N/A                                                                      |                                      |
| <b>Configuration Mode</b> | Config                                                                   |                                      |
| <b>History</b>            | 3.3.4150                                                                 |                                      |
| <b>Role</b>               | admin                                                                    |                                      |
| <b>Example</b>            | <pre>switch (config) # debug ethernet ip arp all switch (config) #</pre> |                                      |
| <b>Related Commands</b>   |                                                                          |                                      |
| <b>Note</b>               |                                                                          |                                      |



## debug ethernet ip dhcp-relay

**debug ethernet ip dhcp-relay {all | error}**  
**no debug ethernet ip dhcp-relay {all | error}**

Configures the trace level for DHCP.  
 The no form of the command disables tracking a specified level.

|                           |                                                                                 |                           |
|---------------------------|---------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | all                                                                             | Enables track traces      |
|                           | error                                                                           | Error code debug messages |
| <b>Default</b>            | N/A                                                                             |                           |
| <b>Configuration Mode</b> | Config                                                                          |                           |
| <b>History</b>            | 3.3.4150                                                                        |                           |
| <b>Role</b>               | admin                                                                           |                           |
| <b>Example</b>            | <pre>switch (config) # debug ethernet ip dhcp-relay all switch (config) #</pre> |                           |
| <b>Related Commands</b>   |                                                                                 |                           |
| <b>Note</b>               |                                                                                 |                           |

## debug ethernet ip igmp-l3

**debug ethernet ip igmp-l3 {all | control-plane | data-path | fail-all | init-shut | management | memory | packet-path | resources}**  
**no debug ethernet ip igmp-l3 {all | control-plane | data-path | fail-all | init-shut | management | memory | packet-path | resources}**

Configures the trace level for IGMP.  
 The no form of the command disables tracking a specified level.

|                           |                                                                              |                                                |
|---------------------------|------------------------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | all                                                                          | Enable track traces                            |
|                           | control-plane                                                                | Control plane traces                           |
|                           | data-path                                                                    | IP packet dump trace                           |
|                           | fail-all                                                                     | All failures including Packet Validation Trace |
|                           | init-shut                                                                    | Init and shutdown messages                     |
|                           | management                                                                   | Management messages                            |
|                           | memory                                                                       | Memory related messages                        |
|                           | packet-dump                                                                  | Packet dump messages                           |
|                           | resources                                                                    | OS resource trace                              |
| <b>Default</b>            | N/A                                                                          |                                                |
| <b>Configuration Mode</b> | Config                                                                       |                                                |
| <b>History</b>            | 3.3.4150                                                                     |                                                |
| <b>Role</b>               | admin                                                                        |                                                |
| <b>Example</b>            | <pre>switch (config) # debug ethernet ip igmp-l3 all switch (config) #</pre> |                                                |
| <b>Related Commands</b>   |                                                                              |                                                |
| <b>Note</b>               |                                                                              |                                                |

## debug ethernet ip igmp-snooping

**debug ethernet ip igmp-snooping {all | forward-db-messages | group-info | init-shut | packet-dump | query | source-info | system-resources-management | timer | vlan-info}**

**no debug ethernet ip igmp-snooping {all | forward-db-messages | group-info | init-shut | packet-dump | query | source-info | system-resources-management | timer | vlan-info}**

Configures the trace level for IGMP snooping.  
The no form of the command disables tracking a specified level.

|                           |                                                                            |                                      |
|---------------------------|----------------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | all                                                                        | Enable track traces                  |
|                           | forward-db-messages                                                        | Forwarding database messages         |
|                           | group-info                                                                 | Group information messages           |
|                           | init-shut                                                                  | Init and shutdown messages           |
|                           | packet-dump                                                                | Packet dump messages                 |
|                           | query                                                                      | Query related messages               |
|                           | source-info                                                                | Source information messages          |
|                           | system-resources-management                                                | System resources management messages |
|                           | timer                                                                      | Timer messages                       |
|                           | vlan-info                                                                  | VLAN information messages            |
| <b>Default</b>            | N/A                                                                        |                                      |
| <b>Configuration Mode</b> | Config                                                                     |                                      |
| <b>History</b>            | 3.3.4150                                                                   |                                      |
| <b>Role</b>               | admin                                                                      |                                      |
| <b>Example</b>            | switch (config) # debug ethernet ip igmp-snooping all<br>switch (config) # |                                      |
| <b>Related Commands</b>   |                                                                            |                                      |
| <b>Note</b>               |                                                                            |                                      |

## debug ethernet ip interface

**debug ethernet ip interface {all | arp-packet-dump | buffer | enet-packet-dump | error | fail-all | filter | trace-error | trace-event}**

**no debug ethernet ip interface {all | arp-packet-dump | buffer | enet-packet-dump | error | fail-all | filter | trace-error | trace-event}**

Configures the trace level for interface.

The no form of the command disables tracking a specified level.

|                           |                                                                                |                                                |
|---------------------------|--------------------------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | all                                                                            | Enable track traces                            |
|                           | arp-packet-dump                                                                | ARP packet dump trace                          |
|                           | buffer                                                                         | Buffer trace                                   |
|                           | enet-packet-dump                                                               | ENET packet dump trace                         |
|                           | error                                                                          | Trace error messages                           |
|                           | fail-all                                                                       | All failures including Packet Validation Trace |
|                           | filter                                                                         | Lower layer traces                             |
|                           | trace-error                                                                    | Trace error messages                           |
|                           | trace-event                                                                    | Trace event messages                           |
| <b>Default</b>            | N/A                                                                            |                                                |
| <b>Configuration Mode</b> | Config                                                                         |                                                |
| <b>History</b>            | 3.3.4150                                                                       |                                                |
| <b>Role</b>               | admin                                                                          |                                                |
| <b>Example</b>            | <pre>switch (config) # debug ethernet ip interface all switch (config) #</pre> |                                                |
| <b>Related Commands</b>   |                                                                                |                                                |
| <b>Note</b>               |                                                                                |                                                |

## debug ethernet ip ospf

**debug ethernet ip ospf {adjacency | all | configuration | ddp-packet | helper | Interface | ism | lrq-packet | lsa\_packet | lsu-packet}**

Configures the trace level for OSPF.

The no form of the command disables tracking a specified level.

|                           |                                                                           |                                              |
|---------------------------|---------------------------------------------------------------------------|----------------------------------------------|
| <b>Syntax Description</b> | adjacency                                                                 | Adjacency formation debug messages           |
|                           | all                                                                       | Enable track traces                          |
|                           | configuration                                                             | Configuration debug messages                 |
|                           | ddp-packet                                                                | DDP packet debug messages                    |
|                           | helper                                                                    | Helper debug messages                        |
|                           | Interface                                                                 | Interface debug messages                     |
|                           | ism                                                                       | Interface State Machine debug messages       |
|                           | lrq-packet                                                                | Link State Request Packet debug messages     |
|                           | lsa_packet                                                                | Link State Acknowledge Packet debug messages |
|                           | lsu-packet                                                                | Link State Update Packet debug messages      |
|                           | nsm                                                                       | Neighbor State Machine debug messages        |
| <b>Default</b>            | N/A                                                                       |                                              |
| <b>Configuration Mode</b> | Config                                                                    |                                              |
| <b>History</b>            | 3.3.4150                                                                  |                                              |
| <b>Role</b>               | admin                                                                     |                                              |
| <b>Example</b>            | <pre>switch (config) # debug ethernet ip ospf all switch (config) #</pre> |                                              |
| <b>Related Commands</b>   |                                                                           |                                              |
| <b>Note</b>               |                                                                           |                                              |

## debug ethernet lacp

**debug ethernet lacp** {all | all-resource | data-path | fail-all | init-shut | management | memory | packet}  
**no debug ethernet lacp** {all | all-resources | data-path | fail-all | init-shut | management | memory | packet}

Configures the trace level for LACP.  
 The no form of the command disables the configured LACP debug traces.

|                           |                                                                        |                           |
|---------------------------|------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | all                                                                    | Enables all traces.       |
|                           | all-resource                                                           | BPDU related messages.    |
|                           | data-path                                                              | Init and shutdown traces. |
|                           | fail-all                                                               | Management messages.      |
|                           | init-shut                                                              | Memory related messages.  |
|                           | management memory                                                      | IP packet dump trace.     |
|                           | memory                                                                 | All failure traces.       |
|                           | packet                                                                 | OS resource trace.        |
| <b>Default</b>            | N/A                                                                    |                           |
| <b>Configuration Mode</b> | Config                                                                 |                           |
| <b>History</b>            | 3.3.4150                                                               |                           |
| <b>Role</b>               | admin                                                                  |                           |
| <b>Example</b>            | <pre>switch (config) # debug ethernet lacp all switch (config) #</pre> |                           |
| <b>Related Commands</b>   |                                                                        |                           |
| <b>Note</b>               |                                                                        |                           |

## debug ethernet lldp

**debug ethernet lldp {all | control-panel | critical-event | data-path | fail-all | init-shut | management | memory | neigh-add | neigh-age-out | neigh-del | neigh-drop | neigh-updt | tlv}**

**no debug ethernet lldp {all | control-panel | critical-event | data-path | fail-all | init-shut | management | memory | neigh-add | neigh-age-out | neigh-del | neigh-drop | neigh-updt | tlv}**

Configures the trace level for LLDP.

The no form of the command disables the configured LLDP debug traces.

|                           |                                                                        |                                 |
|---------------------------|------------------------------------------------------------------------|---------------------------------|
| <b>Syntax Description</b> | all                                                                    | Enables all traces.             |
|                           | control-panel                                                          | Control plane traces.           |
|                           | critical-event                                                         | Critical traces.                |
|                           | data-path                                                              | IP packet dump trace.           |
|                           | fail-all                                                               | All failure traces.             |
|                           | init-shut                                                              | Init and shutdown traces.       |
|                           | management                                                             | Management messages.            |
|                           | memory                                                                 | Memory related messages.        |
|                           | neigh-add                                                              | Neighbor add traces.            |
|                           | neigh-age-out                                                          | Neighbor ageout traces.         |
|                           | neigh-del                                                              | Neighbor delete traces.         |
|                           | neigh-drop                                                             | Neighbor drop traces.           |
|                           | neigh-updt                                                             | Neighbor update traces.         |
|                           | tlv                                                                    | TLV related trace configuration |
| <b>Default</b>            | N/A                                                                    |                                 |
| <b>Configuration Mode</b> | Config                                                                 |                                 |
| <b>History</b>            | 3.3.4150                                                               |                                 |
| <b>Role</b>               | admin                                                                  |                                 |
| <b>Example</b>            | <pre>switch (config) # debug ethernet lldp all switch (config) #</pre> |                                 |
| <b>Related Commands</b>   |                                                                        |                                 |
| <b>Note</b>               |                                                                        |                                 |

## debug ethernet port

### debug ethernet port all

Configures the trace level for port.

The no form of the command disables the configured port debug traces.

|                           |                                                                |
|---------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                            |
| <b>Default</b>            | N/A                                                            |
| <b>Configuration Mode</b> | Config                                                         |
| <b>History</b>            | 3.3.4150                                                       |
| <b>Role</b>               | admin                                                          |
| <b>Example</b>            | switch (config) # debug ethernet port all<br>switch (config) # |
| <b>Related Commands</b>   |                                                                |
| <b>Note</b>               |                                                                |



## debug ethernet qos

**debug ethernet qos {all | all-resource | control-panel | fail-all | filters | init-shut | management | memory | packet}**  
**no debug ethernet qos {all | all-resource | control-panel | fail-all | filters | init-shut | management | memory | packet}**

Configures the trace level for QoS.  
 The no form of the command disables the configured QoS debug traces.

|                           |                                                                |                           |
|---------------------------|----------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | all                                                            | Enables all traces.       |
|                           | all-resource                                                   | OS resource traces.       |
|                           | control-panel                                                  | Control plane traces.     |
|                           | fail-all                                                       | All failure traces.       |
|                           | filters                                                        | Lower layer traces.       |
|                           | init-shut                                                      | Init and shutdown traces. |
|                           | management                                                     | Management messages.      |
|                           | memory                                                         | Memory related messages.  |
|                           | packet                                                         | BPDU related messages.    |
| <b>Default</b>            | N/A                                                            |                           |
| <b>Configuration Mode</b> | Config                                                         |                           |
| <b>History</b>            | 3.3.4150                                                       |                           |
| <b>Role</b>               | admin                                                          |                           |
| <b>Example</b>            | switch (config) # debug ethernet port all<br>switch (config) # |                           |
| <b>Related Commands</b>   |                                                                |                           |
| <b>Note</b>               |                                                                |                           |

## debug ethernet spanning-tree

**debug ethernet spanning-tree {all | error | event | filters | init-shut | management | memory | packet | port-info-state-machine | port-receive-state-machine | port-role-selection-state-machine | port-transit-state-machine | port-transmit-state-machine | protocol-migration-state-machine | timers}**

**no debug ethernet spanning-tree {all | error | event | filters | init-shut | management | memory | packet | port-info-state-machine | port-receive-state-machine | port-role-selection-state-machine | port-transit-state-machine | port-transmit-state-machine | protocol-migration-state-machine | timers}**

Configures the trace level for spanning-tree.

The no form of the command disables the configured spanning-tree debug traces.

|                           |                                                                                 |                               |
|---------------------------|---------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | all                                                                             | Enables all traces.           |
|                           | error                                                                           | Error messages trace.         |
|                           | event                                                                           | Events related messages.      |
|                           | filters                                                                         | Lower later traces.           |
|                           | init-shut                                                                       | Init and shutdown traces.     |
|                           | management                                                                      | Management messages.          |
|                           | memory                                                                          | Memory related messages.      |
|                           | packet                                                                          | BPDU related messages.        |
|                           | port-info-state-machine                                                         | Port information messages.    |
|                           | port-receive-state-machine                                                      | Port received messages.       |
|                           | port-role-selection-state-machine                                               | Port role selection messages. |
|                           | port-transit-state-machine                                                      | Port transition messages.     |
|                           | port-transmit-state-machine                                                     | Port transmission messages.   |
|                           | protocol-migration-state-machine                                                | Protocol migration messages.  |
|                           | timers                                                                          | Timer modules message.        |
| <b>Default</b>            | N/A                                                                             |                               |
| <b>Configuration Mode</b> | Config                                                                          |                               |
| <b>History</b>            | 3.3.4150                                                                        |                               |
| <b>Role</b>               | admin                                                                           |                               |
| <b>Example</b>            | <pre>switch (config) # debug ethernet spanning-tree all switch (config) #</pre> |                               |

**Related Commands**

**Note**

## debug ethernet vlan

**debug ethernet vlan {all | fwd | priority | filters}**  
**no debug ethernet vlan {all | fwd | priority | filters}**

Configures the trace level for VLAN.  
 The no form of the command disables the configured VLAN debug traces.

|                           |                                                                |                     |
|---------------------------|----------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | all                                                            | Enables all traces  |
|                           | fwd                                                            | Forward.            |
|                           | priority                                                       | Priority.           |
|                           | filters                                                        | Lower layer traces. |
| <b>Default</b>            | N/A                                                            |                     |
| <b>Configuration Mode</b> | Config                                                         |                     |
| <b>History</b>            | 3.3.4150                                                       |                     |
| <b>Role</b>               | admin                                                          |                     |
| <b>Example</b>            | switch (config) # debug ethernet vlan all<br>switch (config) # |                     |
| <b>Related Commands</b>   |                                                                |                     |
| <b>Note</b>               |                                                                |                     |

## show debug ethernet

**show debug ethernet {dcbx | ip {arp | dhcp-relay | igmp-snooping | interface | ospf} | lacp | lldp | port | qos | spanning-tree | vlan}**

Displays debug level configuration on a specific switch.

|                           |                                                                                                                                                                       |                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | dcbx                                                                                                                                                                  | Displays the trace level for spanning tree.                                                                                                                                                         |
|                           | ip                                                                                                                                                                    | Displays debug trace level for ethernet routing module. <ul style="list-style-type: none"> <li>• arp</li> <li>• dhcp-relay</li> <li>• igmp-snooping</li> <li>• interface</li> <li>• ospf</li> </ul> |
|                           | lacp                                                                                                                                                                  | Displays the trace level for LACP.                                                                                                                                                                  |
|                           | lldp                                                                                                                                                                  | Displays the trace level for LLDP.                                                                                                                                                                  |
|                           | port                                                                                                                                                                  | Displays the trace level for port.                                                                                                                                                                  |
|                           | qos                                                                                                                                                                   | Displays the trace level for QoS.                                                                                                                                                                   |
|                           | spanning-tree                                                                                                                                                         | Displays the trace level for spanning tree.                                                                                                                                                         |
|                           | vlan                                                                                                                                                                  | Displays the trace level for VLAN.                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                   |                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                      |                                                                                                                                                                                                     |
| <b>History</b>            | 3.3.4150                                                                                                                                                              |                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                 |                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show debug ethernet dcbx dcbx protocol :     management is ON     fail-all is ON     control-panel is ON     tlv is ON switch (config) #</pre> |                                                                                                                                                                                                     |
| <b>Related Commands</b>   |                                                                                                                                                                       |                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                       |                                                                                                                                                                                                     |

## show log debug

**show log debug [continuous | files | matching | not]**

Displays current event debug-log file in a scrollable pager.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | continuous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Displays new event log messages as they arrive.                  |
|                           | files                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Displays archived debug log files.                               |
|                           | matching                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Displays event debug logs that match a given regular expression. |
|                           | not                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Displays event debug logs that do not meet certain criteria.     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                  |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                  |
| <b>Example</b>            | <pre>switch (config) # show log debug Jun 15 16:20:47 switch-627e4c last message repeated 7 times Jun 15 16:20:47 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;QoSHwQueueDelete i4IfIndex[137] Jun 15 16:20:47 switch-627e4c last message repeated 7 times Jun 15 16:20:47 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;QoSHwQueueDelete i4IfIndex[141] Jun 15 16:20:47 switch-627e4c last message repeated 7 times Jun 15 16:20:48 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: ==FshwSetSpeed sx_api_port_speed_admin_set = 0 Jun 15 16:20:48 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: ==FshwGetSpeed sx_api_port_speed_oper_get = 0 Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[89], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[33], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[73], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[121], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[133], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[13], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[81], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[117], u1ConfigOption[6] Jun 15 16:20:49 switch-627e4c issd[6509]: TID 1274844336: [issd.DEBUG]: NPAPI: &gt;&gt;CfaGddConfigPort NS u4IfIndex[65], u1ConfigOption[6] . . . switch (config) #</pre> |                                                                  |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                  |

## 4.10 Event Notifications

MLNX-OS features a variety of supported events. Events are printed in the system log file, and, optionally, can be sent to the system administrator via email, SNMP trap or directly prompted to the terminal.

### 4.10.1 Supported Events

The following table presents the supported events and maps them to their relevant MIB OID.

**Table 27 - Supported Event Notifications and MIB Mapping**

| Event Name                | Event Description                               | MIB OID                                   | Comments                                                                               |
|---------------------------|-------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------|
| asic-chip-down            | ASIC (chip) down                                | Mellanox-EFM-MIB: asicChipDown            | Not supported                                                                          |
| cpu-util-high             | CPU utilization has risen too high              | Mellanox-EFM-MIB: cpuUtilHigh             |                                                                                        |
| disk-space-low            | File system free space has fallen too low       | Mellanox-EFM-MIB: diskSpaceLow            |                                                                                        |
| health-module-status      | Health module status changed                    | Mellanox-EFM-MIB: systemHealthStatus      |                                                                                        |
| insufficient-fans         | Insufficient amount of fans in system           | Mellanox-EFM-MIB: insufficientFans        |                                                                                        |
| insufficient-fans-recover | Insufficient amount of fans in system recovered | Mellanox-EFM-MIB: insufficientFansRecover |                                                                                        |
| insufficient-power        | Insufficient power supply                       | Mellanox-EFM-MIB: insufficientPower       |                                                                                        |
| interface-down            | An interface's link state has changed to DOWN   | RFC1213: linkdown (SNMPv1)                | Supported for Ethernet, InfiniBand and management interfaces for 1U and blade systems  |
| interface-up              | An interface's link state has changed to UP     | RFC1213: linkup (SNMPv1)                  | Supported for Ethernet, InfiniBand and management interfaces for 1U and blade systems. |
| internal-bus-error        | Internal bus (I <sup>2</sup> C) error           | Mellanox-EFM-MIB: internalBusError        |                                                                                        |
| liveness-failure          | A process in the system is detected as hung     | Not implemented                           |                                                                                        |
| low-power                 | Low power supply                                | Mellanox-EFM-MIB: lowPower                |                                                                                        |
| low-power-recover         | Low power supply recover                        | Mellanox-EFM-MIB: lowPowerRecover         |                                                                                        |

**Table 27 - Supported Event Notifications and MIB Mapping**

| Event Name                                                              | Event Description                           | MIB OID                                   | Comments                          |
|-------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------|-----------------------------------|
| new_root                                                                | Local bridge became a root bridge           | Bridge-MIB: newRoot                       | Supported for Ethernet            |
| paging-high                                                             | Paging activity has risen too high          | N/A                                       | Not supported                     |
| power-redundancy-mismatch                                               | Power redundancy mismatch                   | Mellanox-EFM-MIB: powerRedundancyMismatch | Supported for SX65xx only systems |
| process-crash                                                           | A process in the system has crashed         | Mellanox-EFM-MIB: procCrash               |                                   |
| process-exit                                                            | A process in the system unexpectedly exited | Mellanox-EFM-MIB: procUnexpectedExit      |                                   |
| snmp-authtrap                                                           | An SNMPv3 request has failed authentication | Not implemented                           |                                   |
| topology_change                                                         | Topology change triggered by a local bridge | Bridge-MIB: topology-Change               | Supported for Ethernet            |
| unexpected-shutdown                                                     | Unexpected system shutdown                  | Mellanox-EFM-MIB: unexpectedShutdown      |                                   |
| To send, use the CLI command: <code>snmp-server notify send-test</code> | Send a testing event                        | testTrap                                  |                                   |
| N/A                                                                     | Reset occurred due to over-heating of ASIC  | Mellanox-EFM-MIB: asicOverTempReset       | Not supported                     |
| temperature-too-high                                                    | Temperature is too high                     | Mellanox-EFM-MIB: asicOverTemp            |                                   |

### 4.10.2 SNMP Trap Notifications

To set SNMP notification see [Section 4.17.1.6, “Configuring an SNMP Notification,”](#) on page 428.

### 4.10.3 Terminal Notifications

#### ➤ To print events to the terminal:

Set the events you wish to print to the terminal. Run:

```
switch (config) # logging monitor events notice
```

This command prints system events in the severity “notice” to the screen. For example, in case of interface-down event, the following gets printed to the screen.

```
switch (config) #
Wed Jul 10 11:30:42 2013: Interface IB1/17 changed state to DOWN
Wed Jul 10 11:30:43 2013: Interface IB1/18 changed state to DOWN
switch (config) #
```



#### 4.10.4 Email Notifications

➤ *To configure MLNX-OS to send you emails for all configured events and failures:*

**Step 1.** Enter to Config mode. Run:

```
switch >
switch > enable
switch # configure terminal
```

**Step 2.** Set your mailhub to the IP address to be your mail client's server – for example, Microsoft Outlook exchange server.

```
switch (config) # email mailhub <IP address>
```

**Step 3.** Add your email address for notifications. Run:

```
switch (config) # email notify recipient <email address>
```

**Step 4.** Configure the system to send notifications for a specific event. Run:

```
switch (config) # email notify event <event name>
```

**Step 5.** Show the list of events for which an email is sent. Run:

```
switch (config) # show email events
Failure events for which emails will be sent:
 process-crash: A process in the system has crashed
 unexpected-shutdown: Unexpected system shutdown

Informational events for which emails will be sent:
 asic-chip-down: ASIC (Chip) Down
 cpu-util-high: CPU utilization has risen too high
 cpu-util-ok: CPU utilization has fallen back to normal levels
 disk-io-high: Disk I/O per second has risen too high
 disk-io-ok: Disk I/O per second has fallen back to acceptable levels
 disk-space-low: Filesystem free space has fallen too low
.
.
.
switch (config) #
```

**Step 6.** Have the system send you a test email. Run:

```
switch # email send-test

The last command should generate the following email:
-----Original Message-----
From: Admin User [mailto:do-not-reply@switch.]
Sent: Sunday, May 01, 2011 11:17 AM
To: <name>
Subject: System event on switch: Test email for event notification

==== System information:
Hostname: switch
Version: <version> 2011-05-01 14:56:31
...
Date: 2011/05/01 08:17:29
```

Uptime: 17h 8m 28.060s

This is a test email.

==== Done.

## 4.10.5 Commands

### 4.10.5.1 Email Notification

#### email autosupport enable

**email autosupport enable**  
**no email autosupport enable**

Sends automatic support notifications via email.

The no form of the command stops sending automatic support notifications via email.

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | N/A                                        |
| <b>Default</b>            | N/A                                        |
| <b>Configuration Mode</b> | Config                                     |
| <b>History</b>            | 3.2.3000                                   |
| <b>Role</b>               | admin                                      |
| <b>Example</b>            | switch (config) # email autosupport enable |
| <b>Related Commands</b>   | N/A                                        |
| <b>Note</b>               |                                            |

## email autosupport event

**email autosupport event <event>**

**no email autosupport event**

Specifies for which events to send auto-support notification emails.

The no form of the command resets auto-support email security mode to its default.

| Syntax Description | event |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |       | <ul style="list-style-type: none"> <li>process-crash – a process has crashed</li> <li>process-exit – a process unexpectedly exited</li> <li>liveness-failure – a process iss detected as hung</li> <li>cpu-util-high – CPU utilization has risen too high</li> <li>cpu-util-ok – CPU utilization has fallen back to normal levels</li> <li>paging-high – paging activity has risen too high</li> <li>paging-ok – paging activity has fallen back to normal levels</li> <li>disk-space-low – filesystem free space has fallen too low</li> <li>disk-space-ok – filesystem free space is back in the normal range</li> <li>memusage-high – memory usage has risen too high</li> <li>memusage-ok – memory usage has fallen back to acceptable levels</li> <li>netusage-high – network utilization has risen too high</li> <li>netusage-ok – network utilization has fallen back to acceptable levels</li> <li>disk-io-high – disk I/O per second has risen too high</li> <li>disk-io-ok – disk I/O per second has fallen back to acceptable levels</li> <li>unexpected-cluster-join – node has unexpectedly joined the cluster</li> <li>unexpected-cluster-leave – node has unexpectedly left the cluster</li> <li>unexpected-cluster-size – the number of nodes in the cluster is unexpected</li> <li>unexpected-shutdown – unexpected system shutdown</li> <li>interface-up – an interface's link state has changed to up</li> <li>interface-down – an interface's link state has changed to down</li> <li>user-login – a user has logged into the system</li> <li>user-logout – a user has logged out of the system</li> <li>health-module-status – health module Status</li> <li>temperature-too-high – temperature has risen too high</li> <li>low-power – low power supply</li> <li>low-power-recover – low power supply Recover</li> <li>insufficient-power – insufficient power supply</li> <li>power-redundancy-mismatch – power redundancy mismatch</li> <li>insufficient-fans – insufficient amount of fans in system</li> <li>insufficient-fans-recover – insufficient amount of fans in system recovered</li> <li>asic-chip-down – ASIC (Chip) Down</li> <li>internal-bus-error – internal bus (I2C) Error</li> <li>internal-link-speed-mismatch – internal links speed mismatch</li> </ul> |

|                           |                                                         |
|---------------------------|---------------------------------------------------------|
| <b>Default</b>            | N/A                                                     |
| <b>Configuration Mode</b> | Config                                                  |
| <b>History</b>            | 3.2.3000                                                |
| <b>Role</b>               | admin                                                   |
| <b>Example</b>            | switch (config) # email autosupport event process-crash |
| <b>Related Commands</b>   | N/A                                                     |
| <b>Note</b>               |                                                         |

## email autosupport ssl mode

**email autosupport ssl mode {none | tls | tls-none}**

**no email autosupport ssl mode**

Configures type of security to use for auto-support email.

The no form of the command resets auto-support email security mode to its default.

|                           |                                                  |                                                                                                                    |
|---------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | none                                             | Does not use TLS to secure auto-support email.                                                                     |
|                           | tls                                              | Uses TLS over the default server port to secure auto-support email and does not send an email if TLS fails.        |
|                           | tls-none                                         | Attempts TLS over the default server port to secure auto-support email, and falls back on plaintext if this fails. |
| <b>Default</b>            | tls-none                                         |                                                                                                                    |
| <b>Configuration Mode</b> | Config                                           |                                                                                                                    |
| <b>History</b>            | 3.2.3000                                         |                                                                                                                    |
| <b>Role</b>               | admin                                            |                                                                                                                    |
| <b>Example</b>            | switch (config) # email autosupport ssl mode tls |                                                                                                                    |
| <b>Related Commands</b>   | N/A                                              |                                                                                                                    |
| <b>Note</b>               |                                                  |                                                                                                                    |

## email autosupport ssl cert-verify

**email autosupport ssl cert-verify**  
**no email autosupport ssl cert-verify**

Verifies server certificates.  
The no form of the command does not verify server certificates.

|                           |                                                     |
|---------------------------|-----------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                 |
| <b>Default</b>            | N/A                                                 |
| <b>Configuration Mode</b> | Config                                              |
| <b>History</b>            | 3.2.3000                                            |
| <b>Role</b>               | admin                                               |
| <b>Example</b>            | switch (config) # email autosupport ssl cert-verify |
| <b>Related Commands</b>   | N/A                                                 |
| <b>Note</b>               |                                                     |

## email autosupport ssl ca-list

**email autosupport ssl ca-list {<ca-list-name> | default\_ca\_list | none}**  
**no email autosupport ssl ca-list**

Configures supplemental CA certificates for verification of server certificates.  
 The no form of the command removes supplemental CA certificate list.

|                           |                                                                 |                                                |
|---------------------------|-----------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | default_ca_list                                                 | Default supplemental CA certificate list.      |
|                           | none                                                            | No supplemental list; uses built-in list only. |
| <b>Default</b>            | default_ca_list                                                 |                                                |
| <b>Configuration Mode</b> | Config                                                          |                                                |
| <b>History</b>            | 3.2.3000                                                        |                                                |
| <b>Role</b>               | admin                                                           |                                                |
| <b>Example</b>            | switch (config) # email autosupport ssl ca-list default_ca_list |                                                |
| <b>Related Commands</b>   | N/A                                                             |                                                |
| <b>Note</b>               |                                                                 |                                                |



## email dead-letter

**email dead-letter {cleanup max-age <duration> | enable}**  
**no email dead-letter**

Configures settings for saving undeliverable emails.  
 The no form of the command disables sending of emails to vendor auto-support upon certain failures.

|                           |                                                                 |                                                                |
|---------------------------|-----------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | duration                                                        | Example: “5d4h3m2s” for 5 days, 4 hours, 3 minutes, 2 seconds. |
|                           | enable                                                          | Saves dead-letter files for undeliverable emails.              |
| <b>Default</b>            | Save dead letter is enabled<br>The default duration is 14 days  |                                                                |
| <b>Configuration Mode</b> | Config                                                          |                                                                |
| <b>History</b>            | 3.1.0000                                                        |                                                                |
| <b>Role</b>               | admin                                                           |                                                                |
| <b>Example</b>            | switch (config) # email dead-letter enable<br>switch (config) # |                                                                |
| <b>Related Commands</b>   | show email                                                      |                                                                |
| <b>Note</b>               |                                                                 |                                                                |

## email domain

**email domain** <hostname or IP address>

**no email domain**

Sets the domain name from which the emails will appear to come from (provided that the return address is not already fully-qualified). This is used in conjunction with the system hostname to form the full name of the host from which the email appears to come.

The no form of the command clears email domain override.

| Syntax Description | hostname or IP address                                                                                                                                                                                                             | IP address. |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Default            | No email domain                                                                                                                                                                                                                    |             |
| Configuration Mode | Config                                                                                                                                                                                                                             |             |
| History            | 3.1.0000                                                                                                                                                                                                                           |             |
| Role               | admin                                                                                                                                                                                                                              |             |
| Example            | <pre>switch (config) # email domain mellanox switch (config) # show email Mail hub: 10.0.8.11 Mail hub port: 125 Domain: mellanox Return address: do-not-reply Include hostname in return address: yes ... switch (config) #</pre> |             |
| Related Commands   | show emails                                                                                                                                                                                                                        |             |
| Note               |                                                                                                                                                                                                                                    |             |

## email mailhub

**email mailhub <hostname or IP address>**

**no email mailhub**

Sets the mail relay to be used to send notification emails.

The no form of the command clears the mail relay to be used to send notification emails.

| Syntax Description | hostname or IP address                                                                                                                                                                                                                     | Hostname or IP address. |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Default            | N/A                                                                                                                                                                                                                                        |                         |
| Configuration Mode | Config                                                                                                                                                                                                                                     |                         |
| History            | 3.1.0000                                                                                                                                                                                                                                   |                         |
| Role               | admin                                                                                                                                                                                                                                      |                         |
| Example            | <pre>switch (config) # email mailhub 10.0.8.11 switch (config) # show email Mail hub: 10.0.8.11 Mail hub port: 25 Domain: (not specified) Return address: do-not-reply Include hostname in return address: yes ... switch (config) #</pre> |                         |
| Related Commands   | show email [events]                                                                                                                                                                                                                        |                         |
| Note               |                                                                                                                                                                                                                                            |                         |

## email mailhub-port

**email mailhub-port <hostname or IP address>**

**no email mailhub-port**

Sets the mail relay port to be used to send notification emails.  
The no form of the command resets the port to its default.

|                           |                                                                                                                                                                                                                                                 |                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Syntax Description</b> | hostname or IP address                                                                                                                                                                                                                          | hostname or IP address. |
| <b>Default</b>            | 25                                                                                                                                                                                                                                              |                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                          |                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                        |                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                           |                         |
| <b>Example</b>            | <pre>switch (config) # email mailhub-port 125 switch (config) # show email Mail hub: 10.0.8.11 Mail hub port: 125 Domain: (system domain name) Return address: do-not-reply Include hostname in return address: yes ... switch (config) #</pre> |                         |
| <b>Related Commands</b>   | show email                                                                                                                                                                                                                                      |                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                 |                         |

## email notify event

**email notify event** <event name>

**no email notify event** <event name>

Enables sending email notifications for the specified event type.

The no form of the command disables sending email notifications for the specified event type.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | event name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Example event names would include “process-crash” and “cpu-util-high”. |
| <b>Default</b>            | No events are enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                        |
| <b>Example</b>            | <pre>switch (config) # email notify event process-crash switch (config) # show email events</pre> <p>Failure events for which emails will be sent:</p> <p>process-crash: A process in the system has crashed</p> <p>unexpected-shutdown: Unexpected system shutdown</p> <p>Informational events for which emails will be sent:</p> <p>liveness-failure: A process in the system was detected as hung</p> <p>process-exit: A process in the system unexpectedly exited</p> <p>cpu-util-ok: CPU utilization has fallen back to normal levels</p> <p>cpu-util-high: CPU utilization has risen too high</p> <p>disk-io-ok: Disk I/O per second has fallen back to acceptable levels</p> <p>...</p> <p>temperature-too-high: Temperature has risen too high</p> <p>All events for which autosupport emails will be sent:</p> <p>process-crash: A process in the system has crashed</p> <p>liveness-failure: A process in the system was detected as hung</p> <pre>switch (config) # switch (config) #</pre> |                                                                        |
| <b>Related Commands</b>   | show email                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                        |
| <b>Note</b>               | This does not affect auto-support emails. Auto-support can be disabled overall, but if it is enabled, all auto-support events are sent as emails.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                        |

## email notify recipient

**email notify recipient** <email addr> [class {info | failure} | detail]  
**no email notify recipient** <email addr> [class {info | failure} | detail]

Adds an email address from the list of addresses to which to send email notifications of events.

The no form of the command removes an email address from the list of addresses to which to send email notifications of events.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Syntax Description</b> | email addr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Email address of intended recipient.                        |
|                           | class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Specifies which types of events are sent to this recipient. |
|                           | info                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sends informational events to this recipient.               |
|                           | failure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Sends failure events to this recipient.                     |
|                           | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Sends detailed event emails to this recipient.              |
| <b>Default</b>            | No recipients are added                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                             |
| <b>Example</b>            | <pre>switch (config) # email notify recipient user2@autosupport.mellanox.com switch (config) # show email Mail hub: Mail hub port: 25 Domain: (not specified) Return address: user1 Include hostname in return address: no Dead letter settings: Save dead.letter files: yes Dead letter max age: (none) Email notification recipients: user2@autosupport.mellanox.com (all events, in detail) Autosupport emails Enabled: no Recipient: autosupport@autosupport.mellanox.com Mail hub: autosupport.mellanox.com switch (config) #</pre> |                                                             |
| <b>Related Commands</b>   | show email                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                             |

## email return-addr

**email return-addr <username>**  
**no email domain**

Sets the username or fully-qualified return address from which email notifications are sent.

- If the string provided contains an “@” character, it is considered to be fully-qualified and used as-is.
- Otherwise, it is considered to be just the username, and we append “@<host-name>.<domain>”. The default is “do-not-reply”, but this can be changed to “admin” or whatnot in case something along the line does not like fictitious addresses.

The no form of the command resets this attribute to its default.

|                           |                                                                                                                                                                                                                           |           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Syntax Description</b> | username                                                                                                                                                                                                                  | Username. |
| <b>Default</b>            | do-not-reply                                                                                                                                                                                                              |           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                    |           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                  |           |
| <b>Role</b>               | admin                                                                                                                                                                                                                     |           |
| <b>Example</b>            | <pre>switch (config) # email return-addr user1 switch (config) # show email Mail hub: Mail hub port: 25 Domain: (not specified) Return address: user1 Include hostname in return address: yes ... switch (config) #</pre> |           |
| <b>Related Commands</b>   | show email                                                                                                                                                                                                                |           |
| <b>Note</b>               |                                                                                                                                                                                                                           |           |

## email return-host

**email return-host**  
**no email return-host**

Includes the hostname in the return address for emails.  
 The no form of the command does not include the hostname in the return address for emails.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>            | No return host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # no email return-host switch (config) # show email Mail hub: Mail hub port:    25 Domain:           (system domain name) Return address:   my-address Include hostname in return address: no  Current reply address: host@localdomain  Dead letter settings:   Save dead.letter files: yes   Dead letter max age:    5 days  No recipients configured.  Autosupport emails   Enabled:              no   Recipient:            autosupport@autosupport.mellanox.com   Mail hub:             autosupport.mellanox.com switch (config) #</pre> |
| <b>Related Commands</b>   | show email                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Note</b>               | This only takes effect if the return address does not contain an "@" character.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



## email send-test

### email send-test

Sends test-email to all configured event and failure recipients.

|                           |                                                                 |
|---------------------------|-----------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                             |
| <b>Default</b>            | N/A                                                             |
| <b>Configuration Mode</b> | Config                                                          |
| <b>History</b>            | 3.1.0000                                                        |
| <b>Role</b>               | admin                                                           |
| <b>Example</b>            | switch (config) # email autosupport enable<br>switch (config) # |
| <b>Related Commands</b>   | show email [events]                                             |
| <b>Note</b>               |                                                                 |

## email ssl mode

**email ssl mode {none | tls | tls-none}**

**no email ssl mode**

Sets the security mode(s) to try for sending email.

The no form of the command resets the email SSL mode to its default.

|                           |                                           |                                                                                                            |
|---------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | none                                      | No security mode, operates in plaintext.                                                                   |
|                           | tls                                       | Attempts to use TLS on the regular mailhub port, with STARTTLS. If this fails, it gives up.                |
|                           | tls-none                                  | Attempts to use TLS on the regular mailhub port, with STARTTLS. If this fails, it falls back on plaintext. |
| <b>Default</b>            | default-cert                              |                                                                                                            |
| <b>Configuration Mode</b> | Config                                    |                                                                                                            |
| <b>History</b>            | 3.2.3000                                  |                                                                                                            |
| <b>Role</b>               | admin                                     |                                                                                                            |
| <b>Example</b>            | switch (config) # email ssl mode tls-none |                                                                                                            |
| <b>Related Commands</b>   | N/A                                       |                                                                                                            |
| <b>Note</b>               |                                           |                                                                                                            |

## email ssl cert-verify

**email ssl cert-verify**  
**no email ssl cert-verify**

Enables verification of SSL/TLS server certificates for email.  
The no form of the command disables verification of SSL/TLS server certificates for email.

|                           |                                                |
|---------------------------|------------------------------------------------|
| <b>Syntax Description</b> | N/A                                            |
| <b>Default</b>            | N/A                                            |
| <b>Configuration Mode</b> | Config                                         |
| <b>History</b>            | 3.2.3000                                       |
| <b>Role</b>               | admin                                          |
| <b>Example</b>            | switch (config) # email ssl cert-verify        |
| <b>Related Commands</b>   | N/A                                            |
| <b>Note</b>               | This command has no impact unless TLS is used. |

## email ssl ca-list

**email ssl ca-list {<ca-list-name> | default-ca-list | none}**

**no email ssl ca-list**

Specifies the list of supplemental certificates of authority (CA) from the certificate configuration database that is to be used for verification of server certificates when sending email using TLS, if any.

The no form of the command uses no list of supplemental certificates.

|                           |                                                                                         |                                                |
|---------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | ca-list-name                                                                            | Specifies CA list name.                        |
|                           | default-ca-list                                                                         | Uses default supplemental CA certificate list. |
|                           | none                                                                                    | Uses no list of supplemental certificates.     |
| <b>Default</b>            | default-ca-list                                                                         |                                                |
| <b>Configuration Mode</b> | Config                                                                                  |                                                |
| <b>History</b>            | 3.2.3000                                                                                |                                                |
| <b>Role</b>               | admin                                                                                   |                                                |
| <b>Example</b>            | switch (config) # email ssl ca-list none                                                |                                                |
| <b>Related Commands</b>   | N/A                                                                                     |                                                |
| <b>Note</b>               | This command has no impact unless TLS is used, and certificate verification is enabled. |                                                |

## show email

### show email [events]

Shows email configuration or events for which email should be sent upon.

| Syntax Description | events                      show event list                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Example            | <pre>switch (config) # show email Mail hub: Mail hub port:    25 Domain:           (system domain name) Return address:   my-address Include hostname in return address: no  Current reply address: host@localdomain  Dead letter settings:   Save dead.letter files: yes   Dead letter max age:    5 days  No recipients configured.  Autosupport emails   Enabled:             no   Recipient:           autosupport@autosupport.mellanox.com   Mail hub:            autosupport.mellanox.com switch (config) #</pre> |
| Related Commands   | show email                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## 4.11 mDNS

Multicast DNS (mDNS) protocol is used by the SM HA to deliver control information between the InfiniBand nodes via the management interface. To block sending mDNS traffic from the management interface run the command `no ha dns enable`.

### 4.11.1 Commands

## ha dns enable

**ha dns enable**  
**no ha dns enable**

Allows mDNS traffic.  
 The no form of the command blocks mDNS traffic from being sent from mgmt0.

|                           |                                                         |
|---------------------------|---------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                     |
| <b>Default</b>            | Enabled.                                                |
| <b>Configuration Mode</b> | Config                                                  |
| <b>History</b>            | 3.3.4000                                                |
| <b>Role</b>               | admin                                                   |
| <b>Example</b>            | switch (config) # no ha dns enable<br>switch (config) # |
| <b>Related Commands</b>   |                                                         |
| <b>Note</b>               |                                                         |

## 4.12 User Management and Security

### 4.12.1 Authentication, Authorization and Accounting (AAA)

AAA is a term describing a framework for intelligently controlling access to computer resources, enforcing policies, auditing usage, and providing the information necessary to bill for services. These combined processes are considered important for effective network management and security. The AAA feature allows you to verify the identity of, grant access to, and track the actions of users managing the MLNX-OS switch. The MLNX-OS switch supports Remote Access Dial-In User Service (RADIUS) or Terminal Access Controller Access Control device Plus (TACACS+) protocols.

- **Authentication** - authentication provides the initial method of identifying each individual user, typically by entering a valid username and password before access is granted. The AAA server compares a user's authentication credentials with the user credentials stored in a database. If the credentials match, the user is granted access to the network or devices. If the credentials do not match, authentication fails and network access is denied.
- **Authorization** - following the authentication, a user must gain authorization for performing certain tasks. After logging into a system, for instance, the user may try to issue commands. The authorization process determines whether the user has the authority to issue such commands. Simply put, authorization is the process of enforcing policies: determining what types or qualities of activities, resources, or services a user is permitted. Usually, authorization occurs within the context of authentication. Once you have authenticated a user, they may be authorized for different types of access or activity.
- **Accounting** - the last level is accounting, which measures the resources a user consumes during access. This includes the amount of system time or the amount of data a user has sent and/or received during a session. Accounting is carried out by logging of session statistics and usage information, and is used for authorization control, billing, trend analysis, resource utilization, and capacity planning activities.

Authentication, authorization, and accounting services are often provided by a dedicated AAA server, a program that performs these functions. Network access servers interface with AAA servers using the Remote Authentication Dial-In User Service (RADIUS) protocol.

#### 4.12.1.1 RADIUS

RADIUS (Remote Authentication Dial-In User Service), widely used in network environments, is a client/server protocol and software that enables remote access servers to communicate with a central server to authenticate dial-in users and authorize their access to the requested system or service. It is commonly used for embedded network devices such as routers, modem servers, switches and so on. RADIUS is currently the de-facto standard for remote authentication. It is prevalent in both new and legacy systems.

It is used for several reasons:

- RADIUS facilitates centralized user administration
- RADIUS consistently provides some level of protection against an active attacker



#### 4.12.1.2 TACACS+

TACACS (Terminal Access Controller Access Control System), widely used in network environments, is a client/server protocol that enables remote access servers to communicate with a central server to authenticate dial-in users and authorize their access to the requested system or service. It is commonly used for providing NAS (Network Access Security). NAS ensures secure access from remotely connected users. TACACS implements the TACACS Client and provides the AAA (Authentication, Authorization and Accounting) functionalities.

TACACS is used for several reasons:

- Facilitates centralized user administration
- Uses TCP for transport to ensure reliable delivery
- Supports inbound authentication, outbound authentication and change password request for the authentication service
- Provides some level of protection against an active attacker

#### 4.12.1.3 LDAP

LDAP (Lightweight Directory Access Protocol) is an authentication protocol that allows a remote access server to forward a user's logon password to an authentication server to determine whether access can be allowed to a given system. LDAP is based on a client/server model. The switch acts as a client to the LDAP server. A remote user (the remote administrator) interacts only with the switch, not the back-end server and database.

LDAP authentication consists of the following components:

- A protocol with a frame format that utilizes TCP over IP
- A centralized server that stores all the user authorization information
- A client: in this case, the switch

Each entry in the LDAP server is referenced by its Distinguished Name (DN). The DN consists of the user-account name concatenated with the LDAP domain name. If the user-account name is John, the following is an example DN:

```
uid=John,ou=people,dc=domain,dc=com
```

### 4.12.2 User Accounts

There are two general user account types: *admin* and *monitor*. As *admin*, the user is privileged to execute all the available operations. As *monitor*, the user can execute operations that display system configuration and status, or set terminal settings.

**Table 28 - User Roles (Accounts) and Default Passwords**

| User Role | Default Password |
|-----------|------------------|
| admin     | admin            |
| monitor   | monitor          |
| xmladmin  | xmladmin         |
| xmluser   | xmluser          |

To remove passwords from the XML users, run the command `username <username> nopassword`.

## 4.12.3 Commands

### 4.12.3.1 User Accounts

#### username

**username** <username> [capability <cap> | disable [login | password] | full-name <name> | nopassword | password [0 | 7] <password>]  
**no username** <username> [capability | disable [login | password] | full-name]

Creates a user and sets its capabilities, password and name.  
 The no form of the command deletes the user configuration.

|                           |                            |                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | username                   | Specifies a username and creates a user account. New users are created initially with admin privileges but is disabled.                                                                                                                                                                                                                                                                    |
|                           | capability <cap>           | Defines user capabilities. <ul style="list-style-type: none"> <li>• admin - full administrative capabilities</li> <li>• monitor - read only capabilities, can not change the running configuration</li> <li>• unpriv – can only query the most basic information, and cannot take any actions or change any configuration</li> <li>• v_admin – basic administrator capabilities</li> </ul> |
|                           | disable [login   password] | <ul style="list-style-type: none"> <li>• Disable - disable this account</li> <li>• Disable login - disable all logins to this account</li> <li>• Disable password - disable login to this account using a local password</li> </ul>                                                                                                                                                        |
|                           | name                       | Full name of the user.                                                                                                                                                                                                                                                                                                                                                                     |
|                           | nopassword                 | The next login of the user will not require password.                                                                                                                                                                                                                                                                                                                                      |
|                           | 0   7                      | <ul style="list-style-type: none"> <li>• 0: specifies a login password in cleartext</li> <li>• 7: specifies a login password in encrypted text</li> </ul>                                                                                                                                                                                                                                  |
|                           | password                   | Specifies a password for the user in string form. If [0   7] was not specified then the password is in cleartext.                                                                                                                                                                                                                                                                          |
|                           | <b>Default</b>             | The following usernames are available by default: <ul style="list-style-type: none"> <li>• admin</li> <li>• monitor</li> <li>• xmladmin</li> <li>• xmluser</li> </ul>                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Config                     |                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.0000                   |                                                                                                                                                                                                                                                                                                                                                                                            |
|                           | 3.4.0000                   | Updated Example                                                                                                                                                                                                                                                                                                                                                                            |
|                           | 3.4.1100                   | Updated Example                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                      |                                                                                                                                                                                                                                                                                                                                                                                            |

**Example**

```
switch (config) # username monitor full-name smith
switch (config) # show usernames
USERNAME FULL NAME CAPABILITY ACCOUNT STATUS
USERID System Administrator admin Password set
admin System Administrator admin Password set
monitor smith monitor Password set (SHA512)
xmladmin XML Admin User admin Password set (SHA512)
xmluser XML Monitor User monitor Password set (SHA512)
switch (config) #
```

**Related Commands**

```
show usernames
show users
```

**Note**

- To enable a user account, just set a password on it (or use the command `username <user> nopassword` to enable it with no password required for login)
- Removing a user account does not terminate any current sessions that user has open; it just prevents new sessions from being established
- Encrypted password is useful for the command `show configuration`, since the cleartext password cannot be recovered after it is set

## show usernames

### show usernames

Displays list of users and their capabilities.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config) # show usernames USERNAME      FULL NAME      CAPABILITY  ACCOUNT STATUS USERID admin         System Administrator  admin       Password set monitor       smith                monitor     Password set (SHA512) xmladmin      XML Admin User        admin       No password required xmluser       XML Monitor User      monitor     No password required switch (config) #</pre> |
| <b>Related Commands</b>   | username<br>show users                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                          |

## show users

### show users [history]

Displays logged in users and related information such as idle time and what host they have connected from.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Syntax Description</b> | history                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Displays current and historical sessions. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |
| <b>Example</b>            | <pre>switch (config) # show users USERNAME    FULL NAME      LINE   HOST          IDLE admin       System Administrator pts/0   172.22.237.174 0d0h34m4s admin       System Administrator pts/1   172.30.0.127   1d3h30m49s admin       System Administrator pts/3   172.22.237.34  0d0h0m0s switch (config) #show users history admin      pts/3 172.22.237.34   Wed Feb  1 11:56   still logged in admin      pts/3 172.22.237.34   Wed Feb  1 11:42 - 11:46 (00:04)  wtmp begins Wed Feb  1 11:38:10 2012 switch (config) #</pre> |                                           |
| <b>Related Commands</b>   | username<br>show usernames                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                           |

## show whoami

### show whoami

Displays username and capabilities of user currently logged in.

|                           |                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                              |
| <b>Default</b>            | N/A                                                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                         |
| <b>Role</b>               | admin                                                                                            |
| <b>Example</b>            | switch (config) # show whoami<br>Current user: admin<br>Capabilities: admin<br>switch (config) # |
| <b>Related Commands</b>   | username<br>show usernames<br>show users                                                         |
| <b>Note</b>               |                                                                                                  |

### 4.12.3.2 AAA Methods

## aaa accounting

**aaa accounting changes default stop-only tacacs+**  
**no aaa accounting changes default stop-only tacacs+**

Enables logging of system changes to an AAA accounting server.  
 The no form of the command disables the accounting.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | First version                              |
|                    | 3.2.3000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Removed ‘time’ parameter from the command. |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |
| Example            | <pre>switch (config) # aaa accounting changes default stop-only tacacs+ switch (config) # show aaa AAA authorization:   Default User: admin   Map Order: local-only Authentication method(s):   local   radius   tacacs+   ldap Accounting method(s):   tacacs+ switch (config) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                            |
| Related Commands   | show aaa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                            |
| Note               | <ul style="list-style-type: none"><li>• TACACS+ is presently the only accounting service method supported</li><li>• Change accounting covers both configuration changes and system actions that are visible under audit logging, however this feature operates independently of audit logging, so it is unaffected by the “logging level audit mgmt” or “configuration audit” commands</li><li>• Configured TACACS+ servers are contacted in the order in which they appear in the configuration until one accepts the accounting data, or the server list is exhausted</li><li>• Despite the name of the “stop-only” keyword, which indicates that this feature logs a TACACS+ accounting “stop” message, and in contrast to configuration change accounting, which happens after configuration database changes, system actions are logged when the action is started, not when the action has completed</li></ul> |                                            |



## aaa authentication login

**aaa authentication login default <auth method> [<auth method> [<auth method> [<auth method> [<auth method>]]]]**  
**no aaa authentication login**

Sets a sequence of authentication methods. Up to four methods can be configured. The no form of the command resets the configuration to its default.

|                           |                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | auth-method <ul style="list-style-type: none"> <li>• local</li> <li>• radius</li> <li>• tacacs+</li> <li>• ldap</li> </ul>                                                                                                                                                                                              |
| <b>Default</b>            | local                                                                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                   |
| <b>Example</b>            | <pre>switch (config) # aaa authentication login default local radius tacacs+ ldap switch (config) # show aaa AAA authorization:   Default User: admin   Map Order: local-only Authentication method(s):   local   radius   tacacs+   ldap Accounting method(s):   tacacs+ switch (config) #</pre>                       |
| <b>Related Commands</b>   | show aaa                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               | The order in which the methods are specified is the order in which the authentication is attempted. It is required that “local” is one of the methods selected. It is recommended that “local” be listed first to avoid potential problems logging in to local accounts in the face of network or remote server issues. |

## aaa authentication attempts track

**aaa authentication attempts track {downcase | enable}**  
**no aaa authentication attempts track {downcase | enable}**

Configure tracking for failed authentication attempts.  
 The no form of the command clears configuration for tracking authentication failures.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | downcase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Does not convert all usernames to lowercase (for authentication failure tracking purposes only). |
|                           | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Disables tracking of failed authentication attempts                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                  |
| <b>Example</b>            | switch (config) # aaa authentication attempts track enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                  |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This is required for the lockout functionality described below, but can also be used on its own for informational purposes.</li> <li>Disabling tracking does not clear any records of past authentication failures, or the locks in the database. However, it does prevent any updates to this database from being made: no new failures are recorded. It also disables lockout, preventing new lockouts from being recorded and existing lockouts from being enforced.</li> </ul> |                                                                                                  |

## **aaa authentication attempts logout**

**aaa authentication attempts logout {enable | lock-time | max-fail | unlock-time}**  
**no aaa authentication attempts logout {enable | lock-time | max-fail | unlock-time}**

Configures logout of accounts based on failed authentication attempts.  
The no form of the command clears configuration for logout of accounts based on failed authentication attempts.

|                           |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>enable</b>      | <p>Enables locking out of user accounts based on authentication failures.</p> <p>This both suspends enforcement of any existing lockouts, and prevents any new lockouts from being recorded. If lockouts are later re-enabled, any lockouts that had been recorded previously resume being enforced; but accounts which have passed the max-fail limit in the meantime are NOT automatically locked at this time. They would be permitted one more attempt, and then locked, because of how the locking is done: lockouts are applied after an authentication failure, if the user has surpassed the threshold at that time. Lockouts only work if tracking is enabled. Enabling lockouts automatically enables tracking. Disabling tracking automatically disables lockouts.</p>                                                                                                                                                                   |
|                           | <b>lock-time</b>   | <p>Sets maximum permitted consecutive authentication failures before locking out users.</p> <p>Unlike the “max-fail” setting, this does take effect immediately for all accounts</p> <p>If both unlock-time and lock-time are set, the unlock-time must be greater than the lock-time</p> <p>This is not based on the number of consecutive failures, and is therefore divorced from most of the rest of the tally feature, except for the tracking of the last login failure</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                           | <b>max-fail</b>    | <p>Sets maximum permitted consecutive authentication failures before locking out users.</p> <p>This setting only impacts what lockouts are imposed while the setting is active; it is not retroactive to previous logins. So if max-fail is disabled or changed, this does not immediately cause any users to be changed from locked to unlocked or vice-versa.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                           | <b>unlock-time</b> | <p>Enables the auto-unlock of an account after a specified number of seconds if a user account is locked due to authentication failures, counting from the last valid login attempt.</p> <p>Unlike the “max-fail” setting, this does take effect immediately for all accounts.</p> <p>If both unlock-time and lock-time are set, the unlock-time must be greater than the lock-time.</p> <p>Careful with disabling the unlock-time, particularly if you have max-fail set to something, and have not overridden the behavior for the admin (i.e. they are subject to lockouts also). If the admin account gets locked out, and there are no other administrators who can aid, the user may be forced to boot single-user and use the <code>pam_tallybyname</code> command-line utility to unlock your account manually. Even if one is careful not to incur this many authentication failures, it makes the system more subject to DOS attacks.</p> |

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| <b>Default</b>            | N/A                                                         |
| <b>Configuration Mode</b> | Config                                                      |
| <b>History</b>            | 3.2.3000                                                    |
| <b>Role</b>               | admin                                                       |
| <b>Example</b>            | switch (config) # aaa authentication attempts logout enable |
| <b>Related Commands</b>   | N/A                                                         |
| <b>Note</b>               |                                                             |

## aaa authentication attempts class-override

**aaa authentication attempts class-override {admin [no-lockout] | unknown {no-track | hash-username}}**

**no aaa authentication attempts class-override {admin | unknown {no-track | hash-username}}**

Overrides the global settings for tracking and lockouts for a type of account. The no form of the command removes this override and lets the admin be handled according to the global settings.

|                           |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | admin                                                                         | Overrides the global settings for tracking and lockouts for the admin account. This applies only to the single account with the username “admin”. It does not apply to any other users with administrative privileges.                                                                                                                                                                                                    |
|                           | no-lockout                                                                    | Prevents the admin user from being locked out, though the authentication failure history is still tracked (if tracking is enabled overall).                                                                                                                                                                                                                                                                               |
|                           | unknown                                                                       | Overrides the global settings for tracking and lockouts for unknown accounts. The “unknown” class here contains the following categories: <ul style="list-style-type: none"> <li>• Real remote usernames which simply failed authentication</li> <li>• Mis-typed remote usernames</li> <li>• Passwords accidentally entered as usernames</li> <li>• Bogus usernames made up as part of an attack on the system</li> </ul> |
|                           | hash-username                                                                 | Applies a hash function to the username, and stores the hashed result in lieu of the original.                                                                                                                                                                                                                                                                                                                            |
|                           | no-track                                                                      | Does not track authentication for such users (which of course also implies no-lockout).                                                                                                                                                                                                                                                                                                                                   |
|                           |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.2.3000                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | switch (config) # aaa authentication attempts class-override admin no-lockout |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | N/A                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                           |

## aaa authentication attempts reset

**aaa authentication attempts reset {all | user <username>} [{no-clear-history | no-unlock}]**

Clears the authentication history for and/or unlocks specified users.

|                           |                                                                    |                                                                     |
|---------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | all                                                                | Applies function to all users.                                      |
|                           | user                                                               | Applies function to specified user.                                 |
|                           | no-clear-history                                                   | Leaves the history of login failures but unlocks the account.       |
|                           | no-unlock                                                          | Leaves the account locked but clears the history of login failures. |
| <b>Default</b>            | N/A                                                                |                                                                     |
| <b>Configuration Mode</b> | Config                                                             |                                                                     |
| <b>History</b>            | 3.2.3000                                                           |                                                                     |
| <b>Role</b>               | admin                                                              |                                                                     |
| <b>Example</b>            | switch (config) # aaa authentication attempts reset user admin all |                                                                     |
| <b>Related Commands</b>   | N/A                                                                |                                                                     |
| <b>Note</b>               |                                                                    |                                                                     |

## clear aaa authentication attempts

**clear aaa authentication attempts {all | user <username>} [no-clear-history | no-unlock]**

Clears the authentication history for and/or unlocks specified users

|                           |                                                                                 |                                       |
|---------------------------|---------------------------------------------------------------------------------|---------------------------------------|
| <b>Syntax Description</b> | all                                                                             | Applies function to all users.        |
|                           | user                                                                            | Applies function to specified user.   |
|                           | no-clear-history                                                                | Clears the history of login failures. |
|                           | no-unlock                                                                       | Unlocks the account.                  |
| <b>Default</b>            | N/A                                                                             |                                       |
| <b>Configuration Mode</b> | Config                                                                          |                                       |
| <b>History</b>            | 3.2.3000                                                                        |                                       |
| <b>Role</b>               | admin                                                                           |                                       |
| <b>Example</b>            | switch (config) # aaa authentication attempts reset user admin no-clear-history |                                       |
| <b>Related Commands</b>   | N/A                                                                             |                                       |
| <b>Note</b>               |                                                                                 |                                       |



## aaa authorization

**aaa authorization map [default-user <username> | order <policy>]**

**no aaa authorization map [default-user | order]**

Sets the mapping permissions of a user in case a remote authentication is done.  
The no form of the command resets the attributes to default.

|                           |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | username                                                                                                                                                                                                                                                | Specifies what local account the authenticated user will be logged on as when a user is authenticated (via RADIUS or TACACS+) and does not have a local account. If the username is local, this mapping is ignored.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                           | policy                                                                                                                                                                                                                                                  | <p>Sets the user mapping behavior when authenticating users via RADIUS or TACACS+ to one of three choices. The order determines how the remote user mapping behaves. If the authenticated username is valid locally, no mapping is performed. The setting has the following three possible behaviors:</p> <ul style="list-style-type: none"> <li>remote-first - If a local-user mapping attribute is returned and it is a valid local username, it maps the authenticated user to the local user specified in the attribute. Otherwise, it uses the user specified by the default-user command.</li> <li>remote-only - Maps a remote authenticated user if the authentication server sends a local-user mapping attribute. If the attribute does not specify a valid local user, no further mapping is tried.</li> <li>local-only - Maps all remote users to the user specified by the “aaa authorization map default-user &lt;user name&gt;” command. Any vendor attributes received by an authentication server are ignored.</li> </ul> |
| <b>Default</b>            | Default user - admin.<br>Map order - remote-first.                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # aaa authorization map default-user admin switch (config) # show aaa AAA authorization:   Default User: admin   Map Order: remote-first Authentication method(s):   local Accounting method(s):   tacacs+ switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

---

|                         |                      |
|-------------------------|----------------------|
| <b>Related Commands</b> | show aaa<br>username |
|-------------------------|----------------------|

---

|             |                                                                                                                                                                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note</b> | If, for example, the user is locally defined to have admin permission, but in a remote server such as RADIUS the user is authenticated as monitor and the order is remote-first, then the user will be given monitor permissions. |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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## show aaa

### show aaa

Displays the AAA configuration.

|                           |                                                                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                          |
| <b>Default</b>            | N/A                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # show aaa AAA authorization:   Default User: admin   Map Order: remote-first Authentication method(s):   local Accounting method(s):   tacacs+ switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>aaa accounting aaa authentication aaa authorization show aaa show usernames username</pre>                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                              |

## show aaa authentication attempts

**show aaa authentication attempts [configured | status user <username>]]**

Shows the current authentication, authorization and accounting settings.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | authentication attempts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays configuration and history of authentication failures.                     |
|                           | configured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays configuration of authentication failure tracking.                         |
|                           | status user                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Displays status of authentication failure tracking and lockouts for specific user. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                    |
| <b>History</b>            | 3.2.1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                    |
| <b>Example</b>            | <pre> switch (config) # show aaa authentication attempts Configuration for authentication failure tracking and locking:   Track authentication failures:                yes   Lock accounts based on authentication failures: yes   Override treatment of 'admin' user:           (none)   Override treatment of unknown usernames:      hash-usernames  Configuration for lockouts based on authentication failures:   Lock account after consecutive auth failures:  5   Allow retry on locked accounts (unlock time):  after 15 second(s)   Temp lock after each auth failure (lock time): none  Username      Known  Locked  Failures  Last fail time      Last fail from ----- 0Q72B43EHBKT8CB5AF5PGRX3U3B3TUL4CYJP93N(*) no    no          1    2012/ 08/20 14:29:19 ttyS0  (*) Hashed for security reasons switch-627d3c [standalone: master] (config) # switch (config) # </pre> |                                                                                    |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                    |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                    |

### 4.12.3.3 RADIUS

## radius-server

**radius-server** {key <secret>| retransmit <retries> | timeout <seconds>}  
**no radius-server** {key | retransmit | timeout}

Sets global RADIUS server attributes.

The no form of the command resets the attributes to their default values.

|                           |                                                                                                                                                                                                                   |                                                                                              |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | secret                                                                                                                                                                                                            | Sets a secret key (shared hidden text string), known to the system and to the RADIUS server. |
|                           | retries                                                                                                                                                                                                           | Number of retries (0-5) before exhausting from the authentication.                           |
|                           | seconds                                                                                                                                                                                                           | Timeout in seconds between each retry (1-60).                                                |
| <b>Default</b>            | 3 seconds, 1 retry                                                                                                                                                                                                |                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                            |                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                          |                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                             |                                                                                              |
| <b>Example</b>            | <pre>switch (config) #radius-server retransmit 3 switch (config) # show radius RADIUS defaults:   Key:           3333   Timeout:       3   Retransmit:    1 No RADIUS servers configured. switch (config) #</pre> |                                                                                              |
| <b>Related Commands</b>   | <pre>aaa authorization radius-server host show radius</pre>                                                                                                                                                       |                                                                                              |
| <b>Note</b>               | Each RADIUS server can override those global parameters using the command “radius-server host”.                                                                                                                   |                                                                                              |

## radius-server host

**radius-server host** <IP address> [enable | auth-port <port> | key <secret> | prompt-key | retransmit <retries> | timeout <seconds>]  
**no radius-server host** <IP address> [auth-port | enable]

Configures RADIUS server attributes.

The no form of the command resets the attributes to their default values and deletes the RADIUS server.

|                           |                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | IP address                                                                                                                                                                                                                                                                                                                                                                    | RADIUS server IP address                                          |
|                           | enable                                                                                                                                                                                                                                                                                                                                                                        | Administrative enable of the RADIUS server                        |
|                           | auth-port                                                                                                                                                                                                                                                                                                                                                                     | Configures authentication port to use with this RADIUS server     |
|                           | port                                                                                                                                                                                                                                                                                                                                                                          | RADIUS server UDP port number                                     |
|                           | key                                                                                                                                                                                                                                                                                                                                                                           | Configures shared secret to use with this RADIUS server           |
|                           | prompt-key                                                                                                                                                                                                                                                                                                                                                                    | Prompt for key, rather than entering on command line              |
|                           | retransmit                                                                                                                                                                                                                                                                                                                                                                    | Configures retransmit count to use with this RADIUS server        |
|                           | retries                                                                                                                                                                                                                                                                                                                                                                       | Number of retries (0-5) before exhausting from the authentication |
|                           | timeout                                                                                                                                                                                                                                                                                                                                                                       | Configures timeout between each try                               |
|                           | seconds                                                                                                                                                                                                                                                                                                                                                                       | Timeout in seconds between each retry (1-60)                      |
|                           |                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |
| <b>Default</b>            | 3 seconds, 1 retry<br>Default UDP port is 1812                                                                                                                                                                                                                                                                                                                                |                                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                        |                                                                   |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                         |                                                                   |
| <b>Example</b>            | <pre>switch (config) # radius-server host 40.40.40.40 switch (config) # show radius RADIUS defaults:   Key:                3333   Timeout:            3   Retransmit:         1 RADIUS servers:   40.40.40.40:1812     Enabled:          yes     Key:              3333 (default)     Timeout:          3 (default)     Retransmit:       1 (default) switch (config) #</pre> |                                                                   |

---

**Related Commands**

aaa authorization  
radius-server  
show radius

---

**Note**

- RADIUS servers are tried in the order they are configured
  - If you do not specify a parameter for this configured RADIUS server, the configuration will be taken from the global RADIUS server configuration. Refer to “radius-server” command.
-

## show radius

### show radius

Displays RADIUS configurations.

|                           |                                                                                                                                                                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre> switch (config) # show radius RADIUS defaults:   Key:          3333   Timeout:      3   Retransmit:   1 RADIUS servers:   40.40.40.40:1812     Enabled:    yes     Key:        3333 (default)     Timeout:    3 (default)     Retransmit: 1 (default) switch (config) #           </pre> |
| <b>Related Commands</b>   | aaa authorization<br>radius-server<br>radius-server host                                                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                |



### 4.12.3.4 TACACS+

#### **tacacs-server**

**tacacs-server {key <secret> | retransmit <retries> | timeout <seconds>}**  
**no tacacs-server {key | retransmit | timeout}**

Sets global TACACS+ server attributes.  
 The no form of the command resets the attributes to default values.

|                           |                                                                                                                                                                                                                        |                                                                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | secret                                                                                                                                                                                                                 | Set a secret key (shared hidden text string), known to the system and to the TACACS+ server. |
|                           | retries                                                                                                                                                                                                                | Number of retries (0-5) before exhausting from the authentication.                           |
|                           | seconds                                                                                                                                                                                                                | Timeout in seconds between each retry (1-60).                                                |
| <b>Default</b>            | 3 seconds, 1 retry                                                                                                                                                                                                     |                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                 |                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                               |                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                  |                                                                                              |
| <b>Example</b>            | <pre>switch (config) #tacacs-server retransmit 3 switch (config) # show tacacs TACACS+ defaults:     Key:          3333     Timeout:      3     Retransmit:   1 No TACACS+ servers configured. switch (config) #</pre> |                                                                                              |
| <b>Related Commands</b>   | <pre>aaa authorization show radius show tacacs tacacs-server host</pre>                                                                                                                                                |                                                                                              |
| <b>Note</b>               | Each TACACS+ server can override those global parameters using the command "tacacs-server host".                                                                                                                       |                                                                                              |

## tacacs-server host

**tacacs-server host <IP address> {enable | auth-port <port> | auth-type <type> | key <secret> | prompt-key | retransmit <retries> | timeout <seconds>}**  
**no tacacs-server host <IP address> {enable | auth-port}**

Configures TACACS+ server attributes.

The no form of the command resets the attributes to their default values and deletes the TACACS+ server.

| Syntax Description        | IP address                                                               | TACACS+ server IP address                                                                                                                             |
|---------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | enable                                                                   | Administrative enable for the TACACS+ server                                                                                                          |
|                           | auth-port                                                                | Configures authentication port to use with this TACACS+ server                                                                                        |
|                           | port                                                                     | TACACS+ server UDP port number                                                                                                                        |
|                           | auth-type                                                                | Configures authentication type to use with this TACACS+ server                                                                                        |
|                           | type                                                                     | Authentication type. Possible values are: <ul style="list-style-type: none"> <li>• ASCII</li> <li>• PAP (Password Authentication Protocol)</li> </ul> |
|                           | key                                                                      | Configures shared secret to use with this TACACS+ server                                                                                              |
|                           | secret                                                                   | Sets a secret key (shared hidden text string), known to the system and to the TACACS+ server                                                          |
|                           | prompt-key                                                               | Prompts for key, rather than entering key on command line                                                                                             |
|                           | retransmit                                                               | Configures retransmit count to use with this TACACS+ server                                                                                           |
|                           | retries                                                                  | Number of retries (0-5) before exhausting from the authentication                                                                                     |
|                           | timeout                                                                  | Configures timeout to use with this TACACS+ server                                                                                                    |
|                           | seconds                                                                  | Timeout in seconds between each retry (1-60)                                                                                                          |
| <b>Default</b>            | 3 seconds, 1 retry<br>Default TCP port is 49<br>Default auth-type is PAP |                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                   |                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                 |                                                                                                                                                       |
| <b>Role</b>               | admin                                                                    |                                                                                                                                                       |

**Example**

```
switch (config) # tacacs-server host 40.40.40.40
switch (config) # show tacacs
TACACS+ defaults:
 Key: 3333
 Timeout: 3
 Retransmit: 1
TACACS+ servers:
 40.40.40.40:49
 Enabled: yes
 Auth-type PAP
 Key: 3333 (default)
 Timeout: 3 (default)
 Retransmit: 1 (default)
switch (config) #
```

**Related Commands**

```
aaa authorization
show tacacs
tacacs-server
```

**Note**

- TACACS+ servers are tried in the order they are configured
- A PAP auth-type similar to an ASCII login, except that the username and password arrive at the network access server in a PAP protocol packet instead of being typed in by the user, so the user is not prompted
- If the user does not specify a parameter for this configured TACACS+ server, the configuration will be taken from the global TACACS+ server configuration. Refer to “tacacs-server” command.

## show tacacs

### show tacacs

Displays TACACS+ configurations.

|                           |                                                                                                                                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # show tacacs TACACS+ defaults:   Key:          3333   Timeout:      3   Retransmit:   1 TACACS+ servers:   40.40.40.40:49     Enabled:    yes     Auth-type   PAP     Key:        3333 (default)     Timeout:    3 (default)     Retransmit: 1 (default) switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>aaa authorization tacacs-server tacacs-server host</pre>                                                                                                                                                                                                                                          |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                        |

## 4.12.3.5 LDAP

### ldap base-dn

**ldap base-dn <string>**  
**no ldap base-dn**

Sets the base distinguished name (location) of the user information in the schema of the LDAP server.

The no form of the command resets the attribute to its default values.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | string                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | A case-sensitive string that specifies the location in the LDAP hierarchy where the server should begin searching when it receives an authorization request.<br>For example:<br>“ou=users,dc=example,dc=com”, with no spaces.<br>when:<br>ou - Organizational unit<br>dc - Domain component<br>cn - Common name<br>sn - Surname |
| <b>Default</b>            | ou=users,dc=example,dc=com                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                 |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Updated Example                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre> switch (config) # ldap base-dn ou=department,dc=example,dc=com switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : SAMAccountName Bind DN           : Bind password     : Group base DN     : Group attribute   : member LDAP version      : 3 Referrals         : yes Server port       : 389 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |                                                                                                                                                                                                                                                                                                                                 |

|                         |           |
|-------------------------|-----------|
| <b>Related Commands</b> | show ldap |
|-------------------------|-----------|

|             |
|-------------|
| <b>Note</b> |
|-------------|

## ldap bind-dn/bind-password

**ldap {bind-dn | bind-password} <string>**

**no ldap {bind-dn | bind-password}**

Gives the distinguished name or password to bind to on the LDAP server. This can be left empty for anonymous login (the default).

The no form of the command resets the attribute to its default values.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | string                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A case-sensitive string that specifies distinguished name or password to bind to on the LDAP server. |
| <b>Default</b>            | ""                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                      |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Updated Example                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                      |
| <b>Example</b>            | <pre> switch (config) # ldap bind-dn my-dn switch (config) # ldap bind-password my-password switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : SAMAccountName Bind DN           : my-dn Bind password     : my-password Group base DN     : Group attribute   : member LDAP version      : 3 Referrals         : yes Server port       : 389 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |                                                                                                      |
| <b>Related Commands</b>   | show ldap                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                      |
| <b>Note</b>               | For anonymous login, bind-dn and bind-password should be empty strings "".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                      |

## ldap group-attribute/group-dn

**ldap {group-attribute {<group-att> | member | uniqueMember} | group-dn  
<group-dn>}**

**no ldap {group-attribute | group-dn}**

Sets the distinguished name or attribute name of a group on the LDAP server.  
The no form of the command resets the attribute to its default values.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Syntax Description</b> | group-att                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Specifies a custom attribute name.          |
|                           | member                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | groupOfNames or group membership attribute. |
|                           | uniqueMember                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | groupOfUniqueNames membership attribute.    |
|                           | group-dn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | DN of group required for authorization.     |
| <b>Default</b>            | group-att: member<br>group-dn: ""                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Updated Example                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |
| <b>Example</b>            | <pre> switch (config) # ldap group-attribute member switch (config) # ldap group-dn my-group-dn switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : SAMAccountName Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : yes Server port       : 389 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |                                             |



---

|                         |           |
|-------------------------|-----------|
| <b>Related Commands</b> | show ldap |
|-------------------------|-----------|

---

**Note**

- The user's distinguished name must be listed as one of the values of this attribute, or the user will not be authorized to log in
  - After login authentication, if the group-dn is set, a user must be a member of this group or the user will not be authorized to log in. If the group is not set (" " - the default) no authorization checks are done.
- 
-

## ldap host

**ldap host <IP Address> [order <number> last]**

**no ldap host <IP Address>**

Adds an LDAP server to the set of servers used for authentication.  
The no form of the command deletes the LDAP host.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Syntax Description</b> | IP Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IPv4 or IPv6 address.                               |
|                           | number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The order of the LDAP server.                       |
|                           | last                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The LDAP server will be added in the last location. |
| <b>Default</b>            | No hosts configured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Updated Example                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                     |
| <b>Example</b>            | <pre> switch (config) # ldap host 10.10.10.10 switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : SAMAccountName Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : yes Server port       : 389 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |                                                     |
| <b>Related Commands</b>   | <pre> show aaa show ldap </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The system will select the LDAP host to try according to its order</li> <li>New servers are by default added at the end of the list of servers</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                     |

## ldap login-attribute

**ldap login-attribute {<string> | uid | sAMAccountName}**

**no ldap login-attribute**

Sets the attribute name which contains the login name of the user.  
The no form of the command resets this attribute to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Syntax Description</b> | string                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Custom attribute name.                                  |
|                           | uid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | LDAP login name is taken from the user login user-name. |
|                           | sAMAccountName                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SAM Account name, active directory login name.          |
| <b>Default</b>            | sAMAccountName                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                         |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Updated Example                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                         |
| <b>Example</b>            | <pre> switch (config) # ldap login-attribute uid switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : yes Server port       : 389 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |                                                         |
| <b>Related Commands</b>   | <pre> show aaa show ldap </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                         |

## ldap port

**ldap port <port>**  
**no ldap port**

Sets the TCP port on the LDAP server to connect to for authentication.  
 The no form of the command resets this attribute to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Syntax Description</b> | port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TCP port number. |
| <b>Default</b>            | 389                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Updated Example  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |
| <b>Example</b>            | <pre> switch (config) # ldap port 1111 switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : yes Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) #           </pre> |                  |
| <b>Related Commands</b>   | show aaa<br>show ldap                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |

## ldap referrals

**ldap referrals**  
**no ldap referrals**

Enables LDAP referrals.  
 The no form of the command disables LDAP referrals.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | LDAP referrals are enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>History</b>            | 3.1.0000<br>3.4.0000 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre> switch (config) # no ldap referrals switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : no Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) #           </pre> |
| <b>Related Commands</b>   | <pre> show aaa show ldap           </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               | Referral is the process by which an LDAP server, instead of returning a result, will return a referral (a reference) to another LDAP server which may contain further information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## ldap scope

**ldap scope <scope>**

**no ldap scope**

Specifies the extent of the search in the LDAP hierarchy that the server should make when it receives an authorization request.

The no form of the command resets the attribute to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | scope                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>one-level - searches the immediate children of the base dn</li> <li>subtree - searches at the base DN and all its children</li> </ul> |
| <b>Default</b>            | subtree                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                              |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Updated Example                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                              |
| <b>Example</b>            | <pre> switch (config) # ldap scope subtree switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : no Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) #           </pre> |                                                                                                                                                                              |
| <b>Related Commands</b>   | show aaa<br>show ldap                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                              |

## ldap ssl

**ldap ssl {ca-list <options> | cert-verify | ciphers {all | TLS1.2} | mode <mode> | port <port-number>}**  
**no ldap ssl {cert-verify | ciphers | mode | port}**

Sets SSL parameter for LDAP.

The no form of the command resets the attribute to its default value.

| Syntax Description | options                                                                                            | This command specifies the list of supplemental certificates of authority (CAs) from the certificate configuration database that is to be used by LDAP for authentication of servers when in TLS or SSL mode. The options are: <ul style="list-style-type: none"> <li>default-ca-list - uses default supplemental CA certificate list</li> <li>none - no supplemental list, uses the built-in one only</li> </ul> CA certificates are ignored if “ldap ssl mode” is not configured as either “tls” or “ssl”, or if “no ldap ssl cert-verify” is configured. The default-ca-list is empty in the factory default configuration. Use the command: “crypto certificate ca-list default-ca-list name” to add trusted certificates to that list. The “default-ca-list” option requires LDAP to consult the system’s configured global default CA-list for supplemental certificates. |
|--------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | cert-verify                                                                                        | Enables verification of SSL/TLS server certificates. This may be required if the server's certificate is self-signed, or does not match the name of the server.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                    | ciphers {all   TLS1.2}                                                                             | Sets SSL mode to be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                    | mode                                                                                               | Sets the security mode for connections to the LDAP server. <ul style="list-style-type: none"> <li>none – requests no encryption for the LDAP connection</li> <li>ssl – the SSL-port configuration is used, an SSL connection is made before LDAP requests are sent (LDAP over SSL)</li> <li>start-tls – the normal LDAP port is used, an LDAP connection is initiated, and then TLS is started on this existing connection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                    | port-number                                                                                        | Sets the port on the LDAP server to connect to for authentication when the SSL security mode is enabled (LDAP over SSL).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Default            | cert-verify: enabled<br>mode: none (LDAP SSL is not activated)<br>port-number: 636<br>ciphers: all |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | <div>3.1.0000 First version</div> <div>3.2.3000 Added ca-list argument.</div> <div>3.4.0000 Added “ssl ciphers” parameter<br/>Updated Example</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre> switch (config) # ldap ssl mode ssl switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : no Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 5 SSL mode          : ssl Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:   1: 10.10.10.10   2: 10.10.10.12 switch (config) # </pre> |
| <b>Related Commands</b>   | <pre> show aaa show ldap </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If available, the TLS mode is recommended, as it is standardized, and may also be of higher security</li> <li>• The port number is used only for SSL mode. In case the mode is TLS, the LDAP port number will be used.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      |



## ldap timeout

**ldap {timeout-bind | timeout-search} <seconds>**

**no ldap {timeout-bind | timeout-search}**

Sets a global communication timeout in seconds for all LDAP servers to specify the extent of the search in the LDAP hierarchy that the server should make when it receives an authorization request.

The no form of the command resets the attribute to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | timeout-bind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Sets the global LDAP bind timeout for all LDAP servers.   |
|                           | timeout-search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sets the global LDAP search timeout for all LDAP servers. |
|                           | seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Range: 1-60 seconds.                                      |
| <b>Default</b>            | 5 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                           |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Updated Example                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
| <b>Example</b>            | <pre> switch (config) # ldap timeout-bind 10 switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : no Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 10 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |                                                           |
| <b>Related Commands</b>   | <pre> show aaa show ldap </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                           |

## ldap version

**ldap version <version>**

**no ldap version**

Sets the LDAP version.

The no form of the command resets the attribute to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Sets the LDAP version. Values: 2 and 3. |
| <b>Default</b>            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Updated Example                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Example</b>            | <pre> switch (config) # ldap version 3 switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : no Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 10 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) #           </pre> |                                         |
| <b>Related Commands</b>   | show aaa<br>show ldap                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |

## show ldap

### show ldap

Displays LDAP configurations.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                           | 3.4.0000 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre> switch (config) # show ldap User base DN      : ou=department,dc=example,dc=com User search scope : subtree Login attribute   : uid Bind DN           : my-dn Bind password     : my-password Group base DN     : my-group-dn Group attribute   : member LDAP version      : 3 Referrals         : no Server port       : 1111 Search Timeout    : 5 Bind Timeout      : 10 SSL mode          : none Server SSL port   : 636 (not active) SSL ciphers       : TLS1.2 (not active) SSL cert verify   : yes SSL ca-list       : default-ca-list  LDAP servers:  1: 10.10.10.10  2: 10.10.10.12 switch (config) # </pre> |
| <b>Related Commands</b>   | <pre> show aaa show ldap </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## 4.13 Cryptographic (X.509, IPSec)

This chapter contains commands for configuring, generating and modifying x.509 certificates used in the system. Certificates are used for creating a trusted SSL connection to the system.

Crypto commands also cover IPSec configuration commands used for establishing a secure connection between hosts over IP layer which is useful for transferring sensitive information.

### 4.13.1 Commands

#### crypto ipsec ike

**crypto ipsec ike {clear sa [peer {any | <IPv4 or IPv6 address>} local <IPv4 or IPv6 address>] | restart}**

Manage the IKE (ISAKMP) process or database state

| Syntax                    | Description                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| clear                     | Clears IKE (ISAKMP) peering state                                                                                                                                                                                                                                                                                                                  |
| sa                        | Clears IKE generated ISAKMP and IPSec security associations (remote peers are affected)                                                                                                                                                                                                                                                            |
| peer                      | Clears security associations for the specified IKE peer (remote peers are affected)<br>all – clears security associations for all IKE peerings with a specific local address (remote peers are affected)<br>IPv4 or IPv6 address – clears security associations for specific IKE peering with a specific local address (remote peers are affected) |
| IPv4 or IPv6 address      | Clears security associations for the specified IKE peering (remote peer is affected)                                                                                                                                                                                                                                                               |
| local                     | Clear security associations for the specified/all IKE peering (remote peer is affected)                                                                                                                                                                                                                                                            |
| restart                   | Restarts the IKE (ISAKMP) daemon (clears all IKE state, peers may be affected)                                                                                                                                                                                                                                                                     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                             |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                              |
| <b>Example</b>            | switch (config)# crypto ipsec ike restart<br>switch (config)#                                                                                                                                                                                                                                                                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                    |

## crypto ipsec peer local

**crypto ipsec peer** <IPv4 or IPv6 address> **local** <IPv4 or IPv6 address> {**enable** | **keying** {**ike** [**auth** {**hmac-md5** | **hmac-sha1** | **hmac-sha256** | **null**} | **dh-group** | **disable** | **encrypt** | **exchange-mode** | **lifetime** | **local** | **mode** | **peer-identity** | **pfs-group** | **preshared-key** | **prompt-preshared-key** | **transform-set**] | **manual** [**auth** | **disable** | **encrypt** | **local-spi** | **mode** | **remote-spi**]}}

Configures ipsec in the system.

| Syntax Description |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | enable | Enables IPsec peering.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | ike    | <p>Configures IPsec peering using IKE ISAKMP to manage SA keys. It has the following optional parameters:</p> <ul style="list-style-type: none"> <li>• <b>auth</b>: Configures the authentication algorithm for IPsec peering</li> <li>• <b>dh-group</b>: Configures the phase1 Diffie-Hellman group proposed for secure IKE key exchange</li> <li>• <b>disable</b>: Configures this IPsec peering administratively disabled</li> <li>• <b>encrypt</b>: Configures the encryption algorithm for IPsec peering</li> <li>• <b>exchange-mode</b>: Configures the IKE key exchange mode to propose for peering</li> <li>• <b>lifetime</b>: Configures the SA lifetime to propose for this IPsec peering</li> <li>• <b>local-identity</b>: Configures the ISAKMP payload identification value to send as local endpoint's identity</li> <li>• <b>mode</b>: Configures the peering mode for this IPsec peering</li> <li>• <b>peer-identity</b>: Configures the identification value to match against the peer's ISAKMP payload identification</li> <li>• <b>pfs-group</b>: Configures the phase2 PFS (Perfect Forwarding Secrecy) group to propose for Diffie-Hellman exchange for this IPsec peering</li> <li>• <b>preshared-key</b>: Configures the IKE pre-shared key for the IPsec peering</li> <li>• <b>prompt-preshared-key</b>: Prompts for the pre-shared key, rather than entering it on the command line</li> <li>• <b>transform-set</b>: Configures transform proposal parameters</li> </ul> |
|                    | keying | <p>Configures key management for this IPsec peering:</p> <ul style="list-style-type: none"> <li>• <b>auth</b>: Configures the authentication algorithm for this IPsec peering</li> <li>• <b>disable</b>: Configures this IPsec peering administratively disabled</li> <li>• <b>encrypt</b>: Configures the encryption algorithm for this IPsec peering</li> <li>• <b>local-spi</b>: Configures the local SPI for this manual IPsec peering</li> <li>• <b>mode</b>: Configures the peering mode for this IPsec peering</li> <li>• <b>remote-spi</b>: Configures the remote SPI for this manual IPsec peering</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | manual | Configures IPsec peering using manual keys.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                           |                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------|
| <b>Default</b>            | N/A                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                      |
| <b>History</b>            | 3.2.3000                                                                                    |
| <b>Role</b>               | admin                                                                                       |
| <b>Example</b>            | switch (config)# crypto ipsec peer 10.10.10.10 local 10.7.34.139 enable<br>switch (config)# |
| <b>Related Commands</b>   | N/A                                                                                         |
| <b>Note</b>               |                                                                                             |

## crypto certificate ca-list

**crypto certificate ca-list [default-ca-list name {<cert-name> | system-self-signed}]**

**no crypto certificate ca-list [default-ca-list name {<cert-name> | system-self-signed}]**

Adds the specified CA certificate to the default CA certificate list.  
The no form of the command removes the certificate from the default CA certificate list.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Syntax Description</b> | cert-name                                                                                                                                                                                                                                                                                                                                                                                                                 | The name of the certificate. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
| <b>Example</b>            | switch (config) # crypto certificate default-cert name test                                                                                                                                                                                                                                                                                                                                                               |                              |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Two certificates with the same subject and issuer fields cannot both be placed onto the CA list</li> <li>The no form of the command does not delete the certificate from the certificate database</li> <li>Unless specified otherwise, applications that use CA certificates will still consult the well-known certificate bundle before looking at the default-ca-list</li> </ul> |                              |



## crypto certificate default-cert

**crypto certificate default-cert name {<cert-name> | system-self-signed}**  
**no crypto certificate default-cert name {<cert-name> | system-self-signed}**

Designates the named certificate as the global default certificate role for authentication of this system to clients.

The no form of the command reverts the default-cert name to “system-self-signed” (the “cert-name” value is optional and ignored).

|                           |                                                                                                                                                                                                                                                                                                                                    |                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Syntax Description</b> | cert-name                                                                                                                                                                                                                                                                                                                          | The name of the certificate. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                             |                              |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                                                                                           |                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                              |                              |
| <b>Example</b>            | switch (config) # crypto certificate default-cert name test                                                                                                                                                                                                                                                                        |                              |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                |                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• A certificate must already be defined before it can be configured in the default-cert role</li> <li>• If the named default-cert is deleted from the database, the default-cert automatically becomes reconfigured to the factory default, the “system-self-signed” certificate</li> </ul> |                              |

## crypto certificate generation

**crypto certificate generation default {country-code | days-valid | email-addr | hash-algorithm {sha1 | sha256} | key-size-bits | locality | org-unit | organization | state-or-prov}**

Configures default values for certificate generation.

|                           |                                                                               |                                                                                                                                                |
|---------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | country-code                                                                  | Configures the default certificate value for country code with a two-alphanumeric-character code or -- for none.                               |
|                           | days-valid                                                                    | Configures the default certificate value for days valid.                                                                                       |
|                           | email-addr                                                                    | Configures the default certificate value for email address.                                                                                    |
|                           | hash-algorithm {sha1   sha256}                                                | Configures the default certificate hashing algorithm.                                                                                          |
|                           | key-size-bits                                                                 | Configures the default certificate value for private key size. (Private key length in bits – at least 1024, but 2048 is strongly recommended.) |
|                           | locality                                                                      | Configures the default certificate value for locality.                                                                                         |
|                           | org-unit                                                                      | Configures the default certificate value for organizational unit.                                                                              |
|                           | organization                                                                  | Configures the default certificate value for the organization name.                                                                            |
|                           | state-or-prov                                                                 | Configures the default certificate value for state or province.                                                                                |
| <b>Default</b>            | N/A                                                                           |                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                        |                                                                                                                                                |
| <b>History</b>            | 3.2.1000                                                                      | First version                                                                                                                                  |
|                           | 3.3.4350                                                                      | Added “hash-algorithm” parameter                                                                                                               |
| <b>Role</b>               | admin                                                                         |                                                                                                                                                |
| <b>Example</b>            | switch (config) # crypto certificate generation default hash-algorithm sha256 |                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                                           |                                                                                                                                                |
| <b>Note</b>               | The default hashing algorithm used is sha1.                                   |                                                                                                                                                |

## crypto certificate name

**crypto certificate name** {<cert-name> | system-self-signed} {comment <new comment> | generate self-signed [comment <cert-comment> | common-name <domain> | country-code <code> | days-valid <days> | email-addr <address> | hash-algorithm {sha1 | sha256} | key-size-bits <bits> | locality <name> | org-unit <name> | organization <name> | serial-num <number> | state-or-prov <name>]} | private-key pem <PEM string> | prompt-private-key | public-cert [comment <comment string> | pem <PEM string>] | regenerate days-valid <days> | rename <new name>}

**no crypto certificate name** <cert-name>

Configures default values for certificate generation.

The no form of the command clears/deletes certain certificate settings.

| Syntax Description | cert-name            | Unique name by which the certificate is identified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | comment              | Specifies a certificate comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                    | generate self-signed | Generates certificates. This option has the following parameters which may be entered sequentially in any order: <ul style="list-style-type: none"> <li>comment: Specifies a certificate comment (free string)</li> <li>common-name: Specifies the common name of the issuer and subject (e.g. a domain name)</li> <li>country-code: Specifies the country codwo-alphanumeric-character country code, or "--" for none)</li> <li>days-valid: Specifies the number of days the certificate is valid</li> <li>email-addr: Specifies the email address</li> <li>hash-algorithm: Specifies the hashing function used for signature algorithm</li> <li>key-size-bits: Specifies the size of the private key in bits (private key length in bits - at least 1024 but 2048 is strongly recommended)</li> <li>locality: Specifies the locality name</li> <li>org-unit: Specifies the organizational unit name</li> <li>organization: Specifies the organization name</li> <li>serial-num: Specifies the serial number for the certificate (a lower-case hexadecimal serial number prefixed with "0x")</li> <li>state-or-prov: Specifies the state or province name</li> </ul> |
|                    | private-key pem      | Specifies certificate contents in PEM format.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                    | prompt-private-key   | Prompts for certificate private key with secure echo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                    | public-cert          | Installs a certificate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                    | regenerate           | Regenerates the named certificate using configured certificate generation default values for the specified validity period                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | rename               | Renames the certificate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Default            | N/A                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                    |                                                                                                         |                                  |
|--------------------|---------------------------------------------------------------------------------------------------------|----------------------------------|
| Configuration Mode | Config                                                                                                  |                                  |
| History            | 3.2.3000                                                                                                | First version                    |
|                    | 3.3.4402                                                                                                | Added “hash-algorithm” parameter |
| Role               | admin                                                                                                   |                                  |
| Example            | switch (config) # crypto certificate name system-self-signed generate self-signed hash-algorithm sha256 |                                  |
| Related Commands   | N/A                                                                                                     |                                  |
| Note               |                                                                                                         |                                  |

## crypto certificate system-self-signed

### crypto certificate system-self-signed regenerate [days-valid <days>]

Configures default values for certificate generation.

|                           |                                                                                    |                                                       |
|---------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | days-valid                                                                         | Specifies the number of days the certificate is valid |
| <b>Default</b>            | N/A                                                                                |                                                       |
| <b>Configuration Mode</b> | Config                                                                             |                                                       |
| <b>History</b>            | 3.2.1000                                                                           |                                                       |
| <b>Role</b>               | admin                                                                              |                                                       |
| <b>Example</b>            | switch (config) # crypto certificate system-self-signed regenerate<br>days-valid 3 |                                                       |
| <b>Related Commands</b>   | N/A                                                                                |                                                       |
| <b>Note</b>               |                                                                                    |                                                       |

## show crypto certificate

**show crypto certificate** [**detail** | **public-pem** | **default-cert** [**detail** | **public-pem**] | **[name <cert-name> [detail | public-pem] | ca-list [default-ca-list]]**]

Displays information about all certificates in the certificate database.

|                           |                 |                                                                                                              |
|---------------------------|-----------------|--------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ca-list         | Displays the list of supplemental certificates configured for the global default system CA certificate role. |
|                           | default-ca-list | Displays information about the currently configured default certificates of the CA list.                     |
|                           | default-cert    | Displays information about the currently configured default certificate.                                     |
|                           | detail          | Displays all attributes related to the certificate.                                                          |
|                           | name            | Displays information about the certificate specified.                                                        |
|                           | public-pem      | Displays the uninterpreted public certificate as a PEM formatted data string                                 |
| <b>Default</b>            | N/A             |                                                                                                              |
| <b>Configuration Mode</b> | Config          |                                                                                                              |
| <b>History</b>            | 3.2.1000        |                                                                                                              |
| <b>Role</b>               | admin           |                                                                                                              |

**Example**

```

switch (config)# show crypto certificate
Certificate with name 'system-self-signed' (default-cert)
 Comment: system-generated self-signed certifi-
icate
 Private Key: present
 Serial Number: 0x546c935511bcafc21ac0e8249fbe0844
 SHA-1 Fingerprint: fe6df38dd26801971cb2d44f62d-
be492b6063c5f

 Validity:
 Starts: 2012/12/02 13:45:05
 Expires: 2013/12/02 13:45:05

 Subject:
 Common Name: IBM-DEV-Bay4
 Country: IS
 State or Province:
 Locality:
 Organization:
 Organizational Unit:
 E-mail Address:

 Issuer:
 Common Name: IBM-DEV-Bay4
 Country: IS
 State or Province:
 Locality:
 Organization:
 Organizational Unit:
 E-mail Address:
switch (config)#

```

---

**Related Commands**

N/A

**Note**

## show crypto ipsec

**show crypto ipsec [brief | configured | ike | policy | sa ]**

Displays information ipsec configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.2.1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre> switch (config)# show crypto ipsec IPSec Summary ----- Crypto IKE is using pluto (Openswan) daemon. Daemon process state is stopped.  No IPSec peers configured.  IPSec IKE Peering State ----- Crypto IKE is using pluto (Openswan) daemon. Daemon process state is stopped.  No active IPSec IKE peers.  IPSec Policy State ----- No active IPSec policies.  IPSec Security Association State ----- No active IPSec security associations. switch (config)# </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



## 4.14 Scheduled Jobs

Use the commands in this section to manage and schedule the execution of jobs

### 4.14.1 Commands

#### job

**job <job ID>**  
**no job <job ID>**

Creates a job.  
 The no form of the command deletes the job.

|                           |                                                        |             |
|---------------------------|--------------------------------------------------------|-------------|
| <b>Syntax Description</b> | job ID                                                 | An integer. |
| <b>Default</b>            | N/A                                                    |             |
| <b>Configuration Mode</b> | Config                                                 |             |
| <b>History</b>            | 3.1.0000                                               |             |
| <b>Role</b>               | admin                                                  |             |
| <b>Example</b>            | switch (config) # job 100<br>switch (config job 100) # |             |
| <b>Related Commands</b>   | show jobs                                              |             |
| <b>Note</b>               | Job state is lost on reboot.                           |             |

## command

**command** <sequence #> | <command>

**no command** <sequence #>

Adds a CLI command to the job.

The no form of the command deletes the command from the job.

|                           |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sequence #                                                                                                                                                                                                                                                                                                                                       | An integer that controls the order the command is executed relative to other commands in this job. The commands are executed in an ascending order. |
|                           | command                                                                                                                                                                                                                                                                                                                                          | A CLI command.                                                                                                                                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                     |
| <b>Configuration Mode</b> | Config job                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config)# job 100 switch (config job 100) # command 10 "show power" switch (config job 100) #</pre>                                                                                                                                                                                                                                  |                                                                                                                                                     |
| <b>Related Commands</b>   | show jobs                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The command must be defined with inverted commas (“”)</li> <li>The command must be added as it was executed from the “config” mode. For example, in order to change the interface description you need to add the command: “interface &lt;type&gt; &lt;number&gt; description my-description”.</li> </ul> |                                                                                                                                                     |

## comment

**comment** <comment>

**no comment**

Adds a comment to the job.

The no form of the command deletes the comment.

|                           |                                                                                                                 |                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Syntax Description</b> | comment                                                                                                         | The comment to be added (string). |
| <b>Default</b>            | ""                                                                                                              |                                   |
| <b>Configuration Mode</b> | Config job                                                                                                      |                                   |
| <b>History</b>            | 3.1.0000                                                                                                        |                                   |
| <b>Role</b>               | admin                                                                                                           |                                   |
| <b>Example</b>            | <pre>switch (config)# job 100 switch (config job 100) # comment Job_for_example switch (config job 100) #</pre> |                                   |
| <b>Related Commands</b>   | show jobs                                                                                                       |                                   |
| <b>Note</b>               |                                                                                                                 |                                   |

## enable

**enable**  
**no enable**

Enables the specified job.  
The no form of the command disables the specified job.

|                           |                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                        |
| <b>Configuration Mode</b> | Config job                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                      |
| <b>Example</b>            | switch (config)# job 100<br>switch (config job 100) # enable<br>switch (config job 100) #                                  |
| <b>Related Commands</b>   | show jobs                                                                                                                  |
| <b>Note</b>               | If a job is disabled, it will not be executed automatically according to its schedule;<br>nor can it be executed manually. |

## execute

### execute

Forces an immediate execution of the job.

|                           |                                                                                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config job                                                                                                                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config)# job 100 switch (config job 100) # execute switch (config job 100) #</pre>                                                                                                                                                        |
| <b>Related Commands</b>   | show jobs                                                                                                                                                                                                                                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• The job timer (if set) is not canceled and the job state is not changed: i.e. the time of the next automatic execution is not affected</li> <li>• The job will not be run if not currently enabled</li> </ul> |

## fail-continue

**fail-continue**  
**no fail-continue**

Continues the job execution regardless of any job failures.  
 The no form of the command returns fail-continue to its default.

|                           |                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                              |
| <b>Default</b>            | A job will halt execution as soon as any of its commands fails                                   |
| <b>Configuration Mode</b> | Config job                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                         |
| <b>Role</b>               | admin                                                                                            |
| <b>Example</b>            | switch (config)# job 100<br>switch (config job 100) # fail-continue<br>switch (config job 100) # |
| <b>Related Commands</b>   | show jobs                                                                                        |
| <b>Note</b>               |                                                                                                  |

## name

**name** <job name>

**no name**

Configures a name for this job.

The no form of the command resets the name to its default.

|                           |                                                                                                     |                                        |
|---------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Syntax Description</b> | name                                                                                                | Specifies a name for the job (string). |
| <b>Default</b>            | “”.                                                                                                 |                                        |
| <b>Configuration Mode</b> | Config job                                                                                          |                                        |
| <b>History</b>            | 3.1.0000                                                                                            |                                        |
| <b>Role</b>               | admin                                                                                               |                                        |
| <b>Example</b>            | <pre>switch (config)# job 100 switch (config job 100) # name my-job switch (config job 100) #</pre> |                                        |
| <b>Related Commands</b>   | show jobs                                                                                           |                                        |
| <b>Note</b>               |                                                                                                     |                                        |

## schedule type

**schedule type <recurrence type>**

**no schedule type**

Sets the type of schedule the job will automatically execute on.  
The no form of the command resets the schedule type to its default.

|                           |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | recurrence type                                                                                                    | <p>The available schedule types are:</p> <ul style="list-style-type: none"> <li>• daily - the job is executed every day at a specified time</li> <li>• weekly - the job is executed on a weekly basis</li> <li>• monthly - the job is executed every month on a specified day of the month</li> <li>• once - the job is executed once at a single specified date and time</li> <li>• periodic - the job is executed on a specified fixed time interval, starting from a fixed point in time.</li> </ul> |
| <b>Default</b>            | once                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config job                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config)# job 100 switch (config job 100) # schedule type once switch (config job 100) #</pre>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | show jobs                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               | A schedule type is essentially a structure for specifying one or more future dates and times for a job to execute. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## schedule <recurrence type>

**schedule <recurrence type> <interval and date>**

**no schedule**

Sets the type of schedule the job will automatically execute on.

The no form of the command resets the schedule type to its default.

|                           |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | recurrence type                                                                                                      | <p>The available schedule types are:</p> <ul style="list-style-type: none"> <li>• daily - the job is executed every day at a specified time</li> <li>• weekly - the job is executed on a weekly basis</li> <li>• monthly - the job is executed every month on a specified day of the month</li> <li>• once - the job is executed once at a single specified date and time</li> <li>• periodic - the job is executed on a specified fixed time interval, starting from a fixed point in time.</li> </ul> |
|                           | interval and date                                                                                                    | Interval and date, per recurrence type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | once                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config job                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config)# job 100 switch (config job 100) # schedule monthly interval 10 switch (config job 100) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | show jobs                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               | A schedule type is essentially a structure for specifying one or more future dates and times for a job to execute.   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## show jobs

### show jobs [<job-id>]

Displays configuration and state (including results of last execution, if any exist) of all jobs, or of one job if a job ID is specified.

| Syntax Description | job-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Job ID. |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |
| Example            | <pre>switch (config) # show jobs 10 Job 10:   Status:                inactive   Enabled:               yes   Continue on failure:   no   Schedule Type:         once   Time and date:          1970/01/01 00:00:00 +0000   Last Exec Time:        Thu 2012/04/05 13:11:42 +0000   Next Exec Time:        N/A   Commands:     Command 10: show power   Last Output:   =====   Module      Status   =====   PS1         OK   PS2         NOT PRESENT  switch (config) #</pre> |         |
| Related Commands   | show jobs                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |

## 4.15 Statistics and Alarms

### 4.15.1 Commands

#### **stats alarm <alarm-id> clear**

**stats alarm <alarm ID> clear**

Clears alarm state.

|                           |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | alarm ID                                                                        | Alarms supported by the system, for example: <ul style="list-style-type: none"> <li>• cpu_util_indiv - Average CPU utilization too high: percent utilization</li> <li>• disk_io - Operating System Disk I/O per second too high: kilobytes per second</li> <li>• fs_mnt - Free filesystem space too low: percent of disk space free</li> <li>• intf_util - Network utilization too high: bytes per second</li> <li>• memory_pct_used - Too much memory in use: percent of physical memory used</li> <li>• paging - Paging activity too high: page faults</li> <li>• temperature - Temperature is too high: degrees</li> </ul> |
| <b>Default</b>            | N/A                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # stats alarm cpu_util_indiv clear switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Commands</b>   | show stats alarm                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## stats alarm <alarm-id> enable

**stats alarm <alarm-id> enable**  
**no stats alarm <alarm-id> enable**

Enables the alarm.

The no form of the command disables the alarm, notifications will not be received.

|                           |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | alarm ID                                                                         | Alarms supported by the system, for example: <ul style="list-style-type: none"> <li>• cpu_util_indiv - Average CPU utilization too high: percent utilization</li> <li>• disk_io - Operating System Disk I/O per second too high: kilobytes per second</li> <li>• fs_mnt - Free filesystem space too low: percent of disk space free</li> <li>• intf_util - Network utilization too high: bytes per second</li> <li>• memory_pct_used - Too much memory in use: percent of physical memory used</li> <li>• paging - Paging activity too high: page faults</li> <li>• temperature - Temperature is too high: degrees</li> </ul> |
| <b>Default</b>            | The default is different per alarm-id                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # stats alarm cpu_util_indiv enable switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Commands</b>   | show stats alarm                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## stats alarm <alarm-id> event-repeat

**stats alarm <alarm ID> event-repeat {single | while-not-cleared}**

**no stats alarm <alarm ID> event-repeat**

Configures repetition of events from this alarm.

|                           |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | alarm ID                                                                                      | Alarms supported by the system, for example: <ul style="list-style-type: none"> <li>• cpu_util_indiv - Average CPU utilization too high: percent utilization</li> <li>• disk_io - Operating System Disk I/O per second too high: kilobytes per second</li> <li>• fs_mnt - Free filesystem space too low: percent of disk space free</li> <li>• intf_util - Network utilization too high: bytes per second</li> <li>• memory_pct_used - Too much memory in use: percent of physical memory used</li> <li>• paging - Paging activity too high: page faults</li> <li>• temperature - Temperature is too high: degrees</li> </ul> |
|                           | single                                                                                        | Does not repeat events: only sends one event whenever the alarm changes state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                           | while-not-cleared                                                                             | Repeats error events until the alarm clears.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Default</b>            | single                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | monitor/admin                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # stats alarm cpu_util_indiv event-repeat single switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Commands</b>   | show stats alarm                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## stats alarm <alarm-id> {rising | falling}

**stats alarm <alarm ID> {rising | falling} {clear-threshold | error-threshold} <threshold-value>**

Configure alarms thresholds.

|                           |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | alarm ID                                                                                             | Alarms supported by the system, for example: <ul style="list-style-type: none"> <li>cpu_util_indiv - Average CPU utilization too high: percent utilization</li> <li>disk_io - Operating System Disk I/O per second too high: kilobytes per second</li> <li>fs_mnt - Free filesystem space too low: percent of disk space free</li> <li>intf_util - Network utilization too high: bytes per second</li> <li>memory_pct_used - Too much memory in use: percent of physical memory used</li> <li>paging - Paging activity too high: page faults</li> <li>temperature - Temperature is too high: degrees</li> </ul> |
|                           | falling                                                                                              | Configures alarm for when the statistic falls too low.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                           | rising                                                                                               | Configures alarm for when the statistic rises too high.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                           | error-threshold                                                                                      | Sets threshold to trigger falling or rising alarm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                           | clear-threshold                                                                                      | Sets threshold to clear falling or rising alarm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                           | threshold-value                                                                                      | The desired threshold value, different per alarm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>            | Default is different per alarm-id                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # stats alarm cpu_util_indiv falling clear-threshold 10 switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Commands</b>   | show stats alarm                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               | Not all alarms support all four thresholds.                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## stats alarm <alarm-id> rate-limit

**stats alarm <alarm ID> rate-limit {count <count-type> <count> | reset | window <window-type> <duration>}**

Configures alarms rate limit.

|                           |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | alarm ID                                                                                                  | Alarms supported by the system, for example: <ul style="list-style-type: none"> <li>cpu_util_indiv - Average CPU utilization too high: percent utilization</li> <li>disk_io - Operating System Disk I/O per second too high: kilobytes per second</li> <li>fs_mnt - Free filesystem space too low: percent of disk space free</li> <li>intf_util - Network utilization too high: bytes per second</li> <li>memory_pct_used - Too much memory in use: percent of physical memory used</li> <li>paging - Paging activity too high: page faults</li> <li>temperature - Temperature is too high: degrees</li> </ul> |
|                           | count-type                                                                                                | Long medium, or short count (number of alarms).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                           | reset                                                                                                     | Set the count and window durations to default values for this alarm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                           | window-type                                                                                               | Long medium, or short count, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | Short window: 5 alarms in 1 hour<br>Medium window: 20 alarms in 1 day<br>Long window: 50 alarms in 7 days |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | monitor/admin                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | switch (config) # stats alarm paging rate-limit window long 2000<br>switch (config) #                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Commands</b>   | show stats alarm                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## stats chd <chd-id> clear

**stats chd <CHD ID> clear**

Clears CHD counters.

|                           |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | CHD ID                                                                    | CHD supported by the system, for example: <ul style="list-style-type: none"> <li>• cpu_util - CPU utilization: percentage of time spent</li> <li>• cpu_util_ave - CPU utilization average: percentage of time spent</li> <li>• cpu_util_day - CPU utilization average: percentage of time spent</li> <li>• disk_device_io_hour - Storage device I/O read/write statistics for the last hour: bytes</li> <li>• disk_io - Operating system aggregate disk I/O average (KB/sec)</li> <li>• eth_day</li> <li>• eth_hour</li> <li>• eth_ip_day</li> <li>• eth_ip_hour</li> <li>• fs_mnt_day - Filesystem system usage average: bytes</li> <li>• fs_mnt_month - Filesystem system usage average: bytes</li> <li>• fs_mnt_week - Filesystem system usage average: bytes</li> <li>• ib_day</li> <li>• ib_hour</li> <li>• intf_day - Network interface statistics aggregation: bytes</li> <li>• intf_hour - Network interface statistics (same as “interface” sample)</li> <li>• intf_util - Aggregate network utilization across all interfaces</li> <li>• memory_day - Average physical memory usage: bytes</li> <li>• memory_pct - Average physical memory usage</li> <li>• paging - Paging activity: page faults</li> <li>• paging_day - Paging activity: page faults</li> </ul> |
| <b>Default</b>            | N/A                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # stats chd memory_day clear switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Commands</b>   | show stats chd                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



## stats chd <chd-id> enable

**stats chd <chd-id> enable**  
**no stats chd <chd-id> enable**

Enables the CHD.  
 The no form of the command disables the CHD.

|                           |                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | chd-id                                                                     | CHD supported by the system, for example: <ul style="list-style-type: none"> <li>• cpu_util - CPU utilization: percentage of time spent</li> <li>• cpu_util_ave - CPU utilization average: percentage of time spent</li> <li>• cpu_util_day - CPU utilization average: percentage of time spent</li> <li>• disk_device_io_hour - Storage device I/O read/write statistics for the last hour: bytes</li> <li>• disk_io - Operating system aggregate disk I/O average: KB/sec</li> <li>• eth_day</li> <li>• eth_hour</li> <li>• fs_mnt_day - Filesystem system usage average: bytes</li> <li>• fs_mnt_month - Filesystem system usage average: bytes</li> <li>• fs_mnt_week - Filesystem system usage average: bytes</li> <li>• ib_day</li> <li>• ib_hour</li> <li>• intf_day - Network interface statistics aggregation: bytes</li> <li>• intf_hour - Network interface statistics (same as “interface” sample)</li> <li>• intf_util - Aggregate network utilization across all interfaces</li> <li>• memory_day - Average physical memory usage: bytes</li> <li>• memory_pct - Average physical memory usage</li> <li>• paging - Paging activity: page faults</li> <li>• paging_day - Paging activity: page faults</li> </ul> |
| <b>Default</b>            | Enabled                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | monitor/admin                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # stats chd memory_day enable switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Commands</b>   | show stats chd                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## stats chd <chd-id> compute time

**stats chd <CHD ID> compute time {interval | range} <number of seconds>**

Sets parameters for when this CHD is computed.

| Syntax Description        | CHD ID                                                                                                                                                                                                                                                                                                   | Possible IDs:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• cpu_util - CPU utilization: percentage of time spent</li> <li>• cpu_util_ave - CPU utilization average: percentage of time spent</li> <li>• cpu_util_day - CPU utilization average: percentage of time spent</li> <li>• disk_device_io_hour - Storage device I/O read/write statistics for the last hour: bytes</li> <li>• disk_io - Operating system aggregate disk I/O average: KB/sec</li> <li>• eth_day</li> <li>• eth_hour</li> <li>• fs_mnt_day - Filesystem system usage average: bytes</li> <li>• fs_mnt_month - Filesystem system usage average: bytes</li> <li>• fs_mnt_week - Filesystem system usage average: bytes</li> <li>• ib_day</li> <li>• ib_hour</li> <li>• intf_day - Network interface statistics aggregation: bytes</li> <li>• intf_hour - Network interface statistics (same as “interface” sample)</li> <li>• intf_util - Aggregate network utilization across all interfaces</li> <li>• memory_day - Average physical memory usage: bytes</li> <li>• memory_pct - Average physical memory usage</li> <li>• paging - Paging activity: page faults</li> <li>• paging_day - Paging activity: page faults</li> </ul> |
|                           | interval                                                                                                                                                                                                                                                                                                 | Specifies calculation interval (how often to do a new calculation) in number of seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                           | range                                                                                                                                                                                                                                                                                                    | Specifies calculation range, in number of seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                           | number of seconds                                                                                                                                                                                                                                                                                        | Number of seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Default</b>            | Different per CHD                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | monitor/admin                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # stats chd memory_day compute time interval 120 switch (config) # show stats chd memory_day CHD "memory_day" (Average physical memory usage: bytes): Source dataset: sample "memory" Computation basis: time Interval: 120 second(s) Range: 1800 second(s) switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

|                         |                |
|-------------------------|----------------|
| <b>Related Commands</b> | show stats chd |
|-------------------------|----------------|

|             |
|-------------|
| <b>Note</b> |
|-------------|

## stats sample <sample-id> clear

**stats sample <sample ID> clear**

Clears sample history.

|                           |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sample ID                                                                     | Possible sample IDs are: <ul style="list-style-type: none"> <li>• congested</li> <li>• cpu_util - CPU utilization: milliseconds of time spent</li> <li>• disk_device_io - Storage device I/O statistics</li> <li>• disk_io - Operating system aggregate disk I/O: KB/sec</li> <li>• eth</li> <li>• eth-abs</li> <li>• eth_ip</li> <li>• fan - Fan speed</li> <li>• fs_mnt_bytes - Filesystem usage: bytes</li> <li>• fs_mnt_inodes - Filesystem usage: inodes</li> <li>• ib</li> <li>• interface - Network interface statistics</li> <li>• intf_util - Network interface utilization: bytes</li> <li>• memory - System memory utilization: bytes</li> <li>• paging - Paging activity: page faults</li> <li>• power - Power supply usage</li> <li>• power-consumption</li> <li>• temperature - Modules temperature</li> </ul> |
| <b>Default</b>            | N/A                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Example</b>            | <pre>switch (config) # stats sample temperature clear switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Commands</b>   | show stats sample                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## stats sample <sample-id> enable

**stats sample <sample-id> enable**  
**no stats sample <sample-id> enable**

Enables the sample.  
 The no form of the command disables the sample.

|                           |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sample-id                                                                      | Possible sample IDs are: <ul style="list-style-type: none"> <li>• congested</li> <li>• cpu_util - CPU utilization: milliseconds of time spent</li> <li>• disk_device_io - Storage device I/O statistics</li> <li>• disk_io - Operating system aggregate disk I/O: KB/sec</li> <li>• eth</li> <li>• fan - Fan speed</li> <li>• fs_mnt_bytes - Filesystem usage: bytes</li> <li>• fs_mnt_inodes - Filesystem usage: inodes</li> <li>• ib</li> <li>• interface - Network interface statistics</li> <li>• intf_util - Network interface utilization: bytes</li> <li>• memory - System memory utilization: bytes</li> <li>• paging - Paging activity: page faults</li> <li>• power - Power supply usage</li> <li>• power-consumption</li> <li>• temperature - Modules temperature</li> </ul> |
| <b>Default</b>            | Enabled                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # stats sample temperature enable switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | show stats sample                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## stats sample <sample-id> interval

**stats sample <sample ID> interval <number of seconds>**

Sets the amount of time between samples for the specified group of sample data.

|                           |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sample ID                                                                                                                                                                                                                            | Possible sample IDs are: <ul style="list-style-type: none"> <li>• congested</li> <li>• cpu_util - CPU utilization: milliseconds of time spent</li> <li>• disk_device_io - Storage device I/O statistics</li> <li>• disk_io - Operating system aggregate disk I/O: KB/sec</li> <li>• eth</li> <li>• fan - Fan speed</li> <li>• fs_mnt_bytes - Filesystem usage: bytes</li> <li>• fs_mnt_inodes - Filesystem usage: inodes</li> <li>• ib</li> <li>• interface - Network interface statistics</li> <li>• intf_util - Network interface utilization: bytes</li> <li>• memory - System memory utilization: bytes</li> <li>• paging - Paging activity: page faults</li> <li>• power - Power supply usage</li> <li>• power-consumption</li> <li>• temperature - Modules temperature</li> </ul> |
|                           | number of seconds                                                                                                                                                                                                                    | Interval in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | Different per sample                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # stats sample temperature interval 1 switch (config) # show stats sample temperature Sample "temperature" (Modules temperature):   Enabled:          yes   Sampling interval: 1 second switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | show stats sample                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## stats clear-all

### stats clear all

Clears data for all samples, CHDs, and status for all alarms.

|                           |                                                        |
|---------------------------|--------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                    |
| <b>Default</b>            | N/A                                                    |
| <b>Configuration Mode</b> | Config                                                 |
| <b>History</b>            | 3.1.0000                                               |
| <b>Role</b>               | admin                                                  |
| <b>Example</b>            | switch (config) # stats clear-all<br>switch (config) # |
| <b>Related Commands</b>   | N/A                                                    |
| <b>Note</b>               |                                                        |

## stats export

**stats export** <format> <report name> [{after | before} <yyyy/mm/dd>  
<hh:mm:ss>] [filename <filename>]

Exports statistics to a file.

|                           |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | format                                                                                                                                                                                                                                                 | Currently the only supported value for <format> is “csv” (comma-separated value).                                                                                                                                                                                                                              |
|                           | report name                                                                                                                                                                                                                                            | Determines dataset to be exported. Possible report names are: <ul style="list-style-type: none"> <li>memory - Memory utilization</li> <li>paging - Paging I/O</li> <li>cpu_util - CPU utilization</li> </ul>                                                                                                   |
|                           | after   before                                                                                                                                                                                                                                         | Only includes stats collected after or before a specific time.                                                                                                                                                                                                                                                 |
|                           | yyyy/mm/dd                                                                                                                                                                                                                                             | Date: It must be between 1970/01/01 and 2038/01/19.                                                                                                                                                                                                                                                            |
|                           | hh:mm:ss                                                                                                                                                                                                                                               | Time: It must be between 00:00:00 and 03:14:07 UTC and is treated as local time.                                                                                                                                                                                                                               |
|                           | filename                                                                                                                                                                                                                                               | Specifies filename to give new report. If a filename is specified, the stats will be exported to a file of that name; otherwise a name will be chosen automatically and will contain the name of the report and the time and date of the export. Any automatically-chosen name will be given a .csv extension. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # stats export csv memory filename mellanoxexample before 2000/08/14 15:59:50 after 2000/08/14 15:01:50 Generated report file: mellanoxexample.csv switch (config) # show files stats mellanoxexample.csv switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                |
| <b>Related Commands</b>   | show files stats                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                |



## show stats alarm

**show stats alarm [<Alarm ID> [rate-limit]]**

Displays status of all alarms or the specified alarm.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | Alarm ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | May be: <ul style="list-style-type: none"> <li>• cpu_util_indiv - Average CPU utilization too high: percent utilization</li> <li>• disk_io - Operating System Disk I/O per second too high: kilobytes per second</li> <li>• fs_mnt - Free filesystem space too low: percent of disk space free</li> <li>• intf_util - Network utilization too high: bytes per second</li> <li>• memory_pct_used - Too much memory in use: percent of physical memory used</li> <li>• paging - Paging activity too high: page faults</li> <li>• temperature - Temperature is too high: degrees</li> </ul> |
|                           | rate-limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Displays rate limit parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show stats alarm Alarm cpu_util_indiv (Average CPU utilization too high):  ok Alarm disk_io (Operating System Disk I/O per second too high): (dis- abled) Alarm fs_mnt (Free filesystem space too low):                ok Alarm intf_util (Network utilization too high):              (disabled) Alarm memory_pct_used (Too much memory in use):              (disabled) Alarm paging (Paging activity too high):                      ok Alarm temperature (Temperature is too high):                  ok switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Commands</b>   | stats alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## show stats chd

**show stats chd [<CHD ID>]**

Displays configuration of all statistics CHDs.

|                           |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | CHD ID                                                                                                                                                                                                                                                                                                                                                         | May be: <ul style="list-style-type: none"> <li>• <code>cpu_util_indiv</code> - Average CPU utilization too high: percent utilization</li> <li>• <code>disk_io</code> - Operating System Disk I/O per second too high: kilobytes per second</li> <li>• <code>fs_mnt</code> - Free filesystem space too low: percent of disk space free</li> <li>• <code>intf_util</code> - Network utilization too high: bytes per second</li> <li>• <code>memory_pct_used</code> - Too much memory in use: percent of physical memory used</li> <li>• <code>paging</code> - Paging activity too high: page faults</li> <li>• <code>temperature</code> - Temperature is too high: degrees</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show stats chd disk_device_io_hour  CHD "disk_device_io_hour" (Storage device I/O read/write statistics for the last hour: bytes):   Enabled:          yes   Source dataset:   sample "disk_device_io"   Computation basis: data points   Interval:         1 data point(s)   Range:            1 data point(s) switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Commands</b>   | stats chd                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## show stats cpu

### show stats cpu

Displays some basic stats about CPU utilization:

- the current level
- the peak over the past hour
- the average over the past hour

|                           |                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                             |
| <b>Default</b>            | N/A                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # show stats cpu  CPU 0   Utilization:                6%   Peak Utilization Last Hour: 16% at 2012/02/28 08:47:32   Avg. Utilization Last Hour: 8% switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                 |

## show stats sample

**show stats sample [<sample ID>]**

Displays sampling interval for all samples, or the specified one.

|                           |                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sample ID                                                                                                                                                       | Possible sample IDs are: <ul style="list-style-type: none"> <li>• congested</li> <li>• cpu_util - CPU utilization: milliseconds of time spent</li> <li>• disk_device_io - Storage device I/O statistics</li> <li>• disk_io - Operating system aggregate disk I/O: KB/sec</li> <li>• eth</li> <li>• fan - Fan speed</li> <li>• fs_mnt_bytes - Filesystem usage: bytes</li> <li>• fs_mnt_inodes - Filesystem usage: inodes</li> <li>• ib</li> <li>• interface - Network interface statistics</li> <li>• intf_util - Network interface utilization: bytes</li> <li>• memory - System memory utilization: bytes</li> <li>• paging - Paging activity: page faults</li> <li>• power - Power supply usage</li> <li>• power-consumption</li> <li>• temperature - Modules temperature</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # show stats sample fan Sample "fan" (Fan speed):   Enabled:          yes   Sampling interval: 1 minute 11 seconds switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   | N/A                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## 4.16 Chassis Management

The Chassis Manager provides the user access to the following information:

**Table 29 - Chassis Manager Information**

| Accessible Parameters | Description                                           |
|-----------------------|-------------------------------------------------------|
| switch temperatures   | Displays system's temperature                         |
| power supply voltages | Displays power supplies' voltage levels               |
| fan unit              | Displays system fans' status                          |
| power unit            | Displays system power consumers                       |
| Flash memory          | Displays information about system memory utilization. |

Additionally, it monitors:

- AC power to the PSUs
- DC power out from the PSUs
- Chassis failures

### 4.16.1 System Health Monitor

The system health monitor scans the system to decide whether or not the system is healthy. When the monitor discovers that one of the system's modules (leaf, spine, fan, or power supply) is in an unhealthy state or returned from an unhealthy state, it notifies the users through the following methods:

- System logs – accessible to the user at any time as they are saved permanently on the system
- Status LEDs – changed by the system health monitor when an error is found in the system and is resolved
- email/SNMP traps – notification on any error found in the system and resolved

#### 4.16.1.1 Re-Notification on Errors

When the system is in an unhealthy state, the system health monitor notifies the user about the current unresolved issue every X seconds. The user can configure the re-notification gap by running the “health notif-cntr <counter>” command.

#### 4.16.1.2 System Health Monitor Alerts Scenarios

- System Health Monitor sends notification alerts in the following cases:

**Table 30 - System Health Monitor Alerts Scenarios (Sheet 1 of 3)**

| Alert Message                                 | Scenario                                                                                                                 | Notification Indicator                                         | Recovery Action                          | Recovery Message                                       |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------|--------------------------------------------------------|
| Fan <fan_number> speed is below minimal range | A chassis fan speed is below minimal threshold: <ul style="list-style-type: none"> <li>• 15% of maximum speed</li> </ul> | Email, fan LED and system status LED set red, log alert, SNMP. | Check the fan and replace it if required | Fan <fan_number> has been restored to its normal state |

**Table 30 - System Health Monitor Alerts Scenarios (Sheet 2 of 3)**

| Alert Message                                                                | Scenario                                                                                                             | Notification Indicator                                                 | Recovery Action                                                                   | Recovery Message                                                                            |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Fan <fan_number> speed in spine number <spine_number> is below minimal range | A spine fan speed is below minimal threshold: <ul style="list-style-type: none"> <li>30% of maximum speed</li> </ul> | Email, fan LED and system status LED set red, log alert, SNMP          | Check the fan and replace it if required                                          | Fan speed <fan_number> in spine number <spine_number> has been restored to its normal state |
| Fan <fan_number> is unresponsive                                             | A chassis fan is not responsive on MLNX-OS systems                                                                   | Email, fan LED and system status LED set red, log alert, SNMP          | Check fan connectivity and replace it if required                                 | Fan <fan_number> has been restored to its normal state                                      |
| Fan <fan_number> in spine number <spine_number> is unresponsive              | A spine fan is not responsive on MLNX-OS systems                                                                     | Email, fan LED and system status LED set red, log alert, SNMP          | Check fan connectivity and replace it if required                                 | Fan <fan_number> in spine number <spine_number> has been restored to its normal state       |
| Fan <fan_number> is not present                                              | A chassis fan is missing                                                                                             | Email, fan LED and system status LED set red, log alert, SNMP          | Insert a fan unit                                                                 | Fan <fan_number> has been restored to its normal state                                      |
| Fan <fan_number> in spine number <spine_number> is not present.              | A spine fan is missing                                                                                               | Email, fan LED and system status LED set red, log alert, SNMP          | Insert a fan unit                                                                 | Fan <fan_number> in spine number <spine_number> has been restored to its normal state       |
| Insufficient number of working fans in the system                            | Insufficient number of working fans in the system                                                                    | Email, fan LED and system status LED set red, log alert, SNMP          | Plug in additional fans or change faulty fans                                     | The system currently has sufficient number of working fans                                  |
| Power supply <ps_number> is unresponsive                                     | A power supply unit is not responsive, or the power supplied to the PS unit is below 10V on MLNX-OS systems          | Email, power supply LED and system status LED set red, log alert, SNMP | Check the PS module                                                               | Power supply <ps_number> has been restored to its normal state                              |
| Power supply <ps_number> temperature is too hot                              | A power supply unit temperature is higher than the maximum threshold of 70 Celsius on MLNX-OS systems                | Email, power supply LED and system status LED set red, log alert, SNMP | Check chassis fans connections. On MLNX-OS systems, check system fan connections. | Power supply <ps_number> temperature is back to normal                                      |
| Unit/leaf/spine <leaf/spine number> is unresponsive                          | A leaf /spine is not responsive                                                                                      | Email, system status LED set red, log alert, SNMP                      | Check leaf/spine connectivity and replace it if required                          | Leaf/spine number <leaf/spine number> has been restored to its normal state                 |

**Table 30 - System Health Monitor Alerts Scenarios (Sheet 3 of 3)**

| Alert Message                           | Scenario                                                                                                                                                | Notification Indicator                            | Recovery Action         | Recovery Message                      |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------|---------------------------------------|
| Unit/leaf/spine voltage is out of range | One of the voltages in a MLNX-OS unit is below minimal threshold or higher than the maximum threshold - both thresholds are 15% of the expected voltage | Email, system status LED set red, log alert, SNMP | Check leaf connectivity | Unit voltage is in range              |
| ASIC temperature is too hot             | A SwitchX unit temperature is higher than the maximum threshold of 105 Celsius on MLNX-OS systems                                                       | Email, system status LED set red, log alert, SNMP | Check the fans system   | SwitchX temperature is back to normal |

## 4.16.2 Power Management

### 4.16.2.1 Power Supply Options

MLNX-OS offers power redundancy configurations and monitoring for SX65xx systems. SX65xx systems have the following redundancy configuration modes:

- “combined” – no power supply is reserved, the redundancy is not enabled.
- “ps-redundant” – one power supply unit is redundant to the rest. The system can work with one less power supply unit.
- “grid-redundant” – the power supplies are split into two logical power supply grids, first half of the PSUs belongs to grid A and the second half to grid B. The systems can work with only one grid. When using grid-redundancy mode the power budget is calculated according to the minimum power budget between the grids. This mode is available only in SX65xx-NR chassis systems. During switch initialization, or hot-plugging of switch components, MLNX-OS enables and/or disables switch components according to the available power budget.

MLNX-OS may send power alarms (via SNMP or email) as follow:

- If the available budget is insufficient for all the system components an `insufficient-Power` event is generated. In this mode several switch components may be disabled.
- If the total power of the system is insufficient for redundancy, a `lowPower` event is generated.
- If a connected power supply provides below 1.6K Watts or grid-redundancy mode is configured and a power supply is connected to a 110V grid, then a `powerRedundancy-Mismatch` event is generated, where grid redundancy can not be achieved in such configuration.

In case of an insufficient-power mode, the order in which the FRUs are turned ON is first leafs (max...3,2,1) and then the spines (max ... 3), while the order of the FRUs in case of turning them OFF is first the spines (3..max) and then the leafs (1,2,3 ... max). The management cards are not affected.

For the trap OID, please refer to the Mellanox-MIB file.



Power cycle is needed after changing power redundancy mode on SX65xx system.

#### 4.16.2.2 Width Reduction Power Saving

Link width reduction (LWR) is a Mellanox proprietary power saving feature to be utilized to economize the power usage of the fabric. LWR may be used to manually or automatically configure a certain connection between Mellanox switch systems to lower the width of a link from 4X operation to 1X based on the traffic flow.

LWR is relevant only for 40GbE and InfiniBand FDR speeds in which the links are operational at a 4X width.



When “show interfaces” is used, a port’s speed appears unchanged even when only one lane is active.

LWR has three operating modes per interface:

- Disabled – LWR does not operate and the link remains in 4X under all circumstances.
- Automatic – the link automatically alternates between 4X and 1X based on traffic flow.
- Force – a port is forced to operate in 1X mode lowering the throughput capability of the port. This mode should be chosen in cases where constant low throughput is expected on the port for a certain time period – after which the port should be configured to one of the other two modes, to allow higher throughput to pass through the port.



See command “[power-management width](#)” on page 397.

**Table 31 - LWR Configuration Behavior**

| Switch-A Configuration | Switch-B Configuration | Behavior                                                                                                                                      |
|------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Disable                | Disable                | LWR is disabled.                                                                                                                              |
| Disable                | Force                  | Transmission from Switch-B to Switch-A operates at 1X. On the opposite direction, LWR is disabled.                                            |
| Disable                | Auto                   | Depending on traffic flow, transmission from Switch-B to Switch-A may operate at 1X. On the opposite direction, LWR is disabled.              |
| Auto                   | Force                  | Transmission from Switch-B to Switch-A operates at 1 lane. Transmission from Switch-A to Switch-B may operate at 1X depending on the traffic. |



**Table 31 - LWR Configuration Behavior**

| Switch-A Configuration | Switch-B Configuration | Behavior                                            |
|------------------------|------------------------|-----------------------------------------------------|
| Auto                   | Auto                   | Width of the connection depends on the traffic flow |
| Force                  | Force                  | Connection between the switches operates at 1X      |

#### 4.16.2.3 Managing Chassis Power

It is possible to shut down or power up modules in a chassis by using the `power enable` and `no power enable` commands.

**Step 1.** Change to Config mod. Run:

```
switch [standalone: master] > enable
switch [standalone: master] # configure terminal
switch [standalone: master] (config) #
```

**Step 2.** Run the command `power enable ?` to get a list of modules that are available to power up or down.

**Step 3.** To power down a module run the command `no power enable` followed by a module.

```
switch [standalone: master] (config) # no power enable ps1
switch [standalone: master] (config) #
```

**Step 4.** To power up a module run the command `power enable` followed by a module.

```
switch [standalone: master] (config) # power enable ps1
switch [standalone: master] (config) #
```

Using the `show power` command it is possible to see the power consumption of the system and also the power consumption by power supply unit.

### 4.16.3 Monitoring Environmental Conditions

**Step 1.** Display module's temperature. Run:

```
switch (config) # show temperature
=====
Module Sensor CurTemp Status
 (Celsius)
=====
MGMT CPU_BOARD_MONITOR 40.00 OK
L01 BOARD_MONITOR 27.00 OK
L01 QSFP_TEMP1 24.00 OK
L01 QSFP_TEMP2 22.00 OK
L01 QSFP_TEMP3 21.00 OK
L01 SX 38.00 OK
L02 BOARD_MONITOR 27.00 OK
L02 QSFP_TEMP1 24.50 OK
L02 QSFP_TEMP2 22.50 OK
L02 QSFP_TEMP3 21.50 OK
L02 SX 32.00 OK
PS2 PS_MONITOR 24.66 OK
PS3 PS_MONITOR 31.04 OK
PS4 PS_MONITOR 28.06 OK
S01 BOARD_MONITOR 23.00 OK
S01 SX 34.00 OK
S01 SX_AMBIENT_TEMP 22.50 OK
S02 BOARD_MONITOR 24.00 OK
S02 SX 49.00 OK
S02 SX_AMBIENT_TEMP 24.00 OK
switch (config) #
```

**Step 2.** Display measured voltage levels of power supplies. Run:

```
switch (config) # show voltage
=====
Module Power Meter Reg Expected Actual Status
 Voltage Voltage
=====
PS2 PS_MONITOR V1 48.00 46.88 OK
PS3 PS_MONITOR V1 48.00 48.29 OK
PS4 PS_MONITOR V1 48.00 48.29 OK
MGMT CPU_BOARD_MONITOR V1 12.00 11.92 OK
MGMT CPU_BOARD_MONITOR V2 2.50 2.48 OK
MGMT CPU_BOARD_MONITOR V3 3.30 3.31 OK
MGMT CPU_BOARD_MONITOR V4 3.30 3.30 OK
MGMT CPU_BOARD_MONITOR V5 1.80 1.81 OK
MGMT CPU_BOARD_MONITOR V6 1.20 1.26 OK
S01 BOARD_MONITOR V1 3.30 3.33 OK
S01 BOARD_MONITOR V2 2.27 2.15 OK
S01 BOARD_MONITOR V3 1.80 1.76 OK
S01 BOARD_MONITOR V4 3.30 3.30 OK
S01 BOARD_MONITOR V5 0.90 0.93 OK
S01 BOARD_MONITOR V6 1.20 1.19 OK
S02 BOARD_MONITOR V1 3.30 3.26 OK
S02 BOARD_MONITOR V2 2.27 2.16 OK
S02 BOARD_MONITOR V3 1.80 1.79 OK
S02 BOARD_MONITOR V4 3.30 3.31 OK
S02 BOARD_MONITOR V5 0.90 0.95 OK
S02 BOARD_MONITOR V6 1.20 1.20 OK
L01 BOARD_MONITOR V1 3.30 3.33 OK
L01 BOARD_MONITOR V2 2.27 2.16 OK
L01 BOARD_MONITOR V3 1.80 1.76 OK
L01 BOARD_MONITOR V4 3.30 3.30 OK
L01 BOARD_MONITOR V5 0.90 0.93 OK
L01 BOARD_MONITOR V6 1.20 1.19 OK
L02 BOARD_MONITOR V1 3.30 3.26 OK
L02 BOARD_MONITOR V2 2.27 2.17 OK
L02 BOARD_MONITOR V3 1.80 1.79 OK
L02 BOARD_MONITOR V4 3.30 3.30 OK
L02 BOARD_MONITOR V5 0.90 0.89 OK
L02 BOARD_MONITOR V6 1.20 1.19 OK
switch (config) #
```

**Step 3.** Display the fan speed and status. Run:

```
switch (config) # show fan
=====
Module Device Fan Speed Status
 (RPM)
=====
FAN1 FAN F1 6994.00 OK
FAN2 FAN F1 6792.00 OK
FAN3 FAN F1 6870.00 OK
FAN4 FAN F1 6818.00 OK
S01 FAN F1 7800.00 OK
S01 FAN F2 8130.00 OK
S02 FAN F1 8130.00 OK
S02 FAN F2 8490.00 OK
S03 FAN - - NOT PRESENT
S04 FAN - - NOT PRESENT
S05 FAN - - NOT PRESENT
S06 FAN - - NOT PRESENT
switch (config) #
```

**Step 4.** Display the voltage current and status of each module in the system. Run:

```
switch (config) # show power consumers
=====
Module Power Voltage Current Status
 (Watts)
=====
FAN1 15.55 48.00 0.32 OK
FAN2 16.26 48.00 0.34 OK
FAN3 15.30 48.00 0.32 OK
FAN4 14.98 48.00 0.31 OK
L01 32.45 48.00 0.68 OK
L02 28.75 48.00 0.60 OK
MGMT 16.08 48.00 0.34 OK
S01 37.34 48.00 0.78 OK
S02 35.09 48.00 0.73 OK

Total power used : 211.79 W
Max power : 686.00 W
switch (config) #
```

#### 4.16.4 USB Access

MLNX-OS can access USB devices attached to switch systems. USB devices are automatically recognized and mounted upon insertion. To access a USB device for reading or writing a file, you need to provide the path to the file on the mounted USB device in the following format:

```
scp://username:password@hostname/var/mnt/usb1/<file name>
```

While username and password are the admin username and password and hostname is the IP of the switch.

Examples:

- **To fetch an image from a USB device, run the command:**

```
switch (config) # "image fetch scp://admin:admin@10.10.10.10/var/mnt/usb1/image.img
```

- **To save log file 'my-logfile' to a USB device under the name test\_logfile using the logging files command, run (in Enable or Config mode):**

```
switch (config) # logging files upload my-logfile scp://username:password@hostname/var/
mnt/usb1/test_logfile
switch (config) #
```

- **To safely remove the USB and to flush the cache, after writing (log files, for example) to a USB, use the usb eject command (in Enable or Config mode).**

```
switch (config) # usb eject
switch (config) #
```

### 4.16.5 High Availability (HA)

Mellanox high end management SX65xx systems support redundant management modules. Chassis HA reduces downtime as it assures continuity of the work even when a management module dies. Chassis HA management allows the systems administrator to associate a single IP address with the appliance. Connecting to that IP address allows the user to change and review the system's chassis parameters regardless of the active management module.

**Figure 13: SX65xx with Dual Management Modules**



#### 4.16.5.1 Chassis High Availability Nodes Roles

Every node in the Chassis HA has one of the following roles/modes:

- Master – the node that manages chassis configurations and services the chassis IP addresses
- Slave – the node that replaces the Master node and takes over its responsibilities once the Master node is down.



The master node is the only node that has access to chassis components such as temperature, inventory and firmware.

The CPU role of the current management node can be recognized by the following methods:

- Run the show chassis ha command.

```
switch (config) # show chassis ha
2-node HA state:
 Box management IP: 172.30.1.200/16
 interface: mgmt0

 local role: master
 local slot: 1
 other state: active
 reset count: 0

switch (config) #
```

- Check the LEDs in the management modules as displayed in the figure below.

**Figure 14: SX60xx's LEDs**



- Go to the WebUI => System => Modules page and see the information on the LEDs.

#### 4.16.5.2 Malfunctioned CPU Behavior

When a CPU is not responding to an internal communication with the other CPU, the non responding CPU will be reset by the other CPU. Each time a CPU resets, a counter is incremented. After 5 resets a CPU is considered malfunctioned and will be shut down.

To verify how many times a CPU is reset, run the following command:

```
switch-11a14e [default: master] (config) # show chassis ha
2-node HA state:
 Box management IP: 172.30.1.200/16
 interface: mgmt0

 local role: master
 local slot: 1
 other state: active
 reset count: 1

switch-11a14e [default: master] (config) #
```

To verify if a CPU has been shut down, either run the following command:

```
switch-11a14e [default: master] (config) # show chassis ha
2-node HA state:
 Box management IP: 172.30.1.200/16
 interface: mgmt0

 local role: master
 local slot: 1
 other state: shot
 reset count: 5

switch-11a14e [default: master] (config) #
```

Or check the system page in the WebUI, the management figure will be grayed out.

To enable the malfunctioned CPU, first replace it and run `chassis ha reset other`.

#### 4.16.5.3 Box IP Centralized Location

Box IP (BIP) centralized management infrastructure enables you to configure and monitor the system. The BIP continues to function even if one of the management blades dies. Box IP is defined by running the `chassis ha bip <board IP address>` command. The created BIP is used as the master IP's alias.

##### Example:

```
SX648 [standalone: master] (config) # chassis ha bip 192.168.10.100 255.255.255.0
SX648 [standalone: master] (config) #
```

#### 4.16.5.4 System Configuration

System configuration changes should be performed by the master using the BIP otherwise they are overridden by the master configuration.

Chassis HA is based on database replication enabling the entire master configuration to be replicated to the slave. Data such as chassis configuration is replicated. However, run time information such as time, logs, active user lists, is not copied. Additionally, node specific configuration information such as host name and IP address is not copied..



Chassis HA requires connectivity of both management modules (mgmt0, mgmt1) in the same broadcast domain.

#### 4.16.5.5 Takeover Functionally

Management CPU functional takeover takes up to 20-30 seconds. However, when plugging in a module, you need to wait for approximately 3 minutes before making any other hardware change. During the takeover process, the Master LED status is differentiated by a color scheme, see [Figure 14](#). To verify the system's status, run the “show chassis ha” command on both managements.

In case of CPU malfunction the system tries to reset it 5 times to solve the issue. If the CPU is not activated after resetting, the system powers it off as well as its attached spine. Once the CPU is powered off, the user should replace the malfunctioned CPU module. To power on the CPU and the attached spine, plug the module in, log into the Master CPU and run the “chassis ha power enable other” command.



Although the LEDs are functional during the takeover, wait for approximately 3 minutes before making any other hardware change.

### Master Example

```
switch [default: master] (config) # show chassis ha
2-node HA state:
 Box management IP: 172.30.1.200/16
 interface: mgmt0

 local role: master
 local slot: 1
 other state: active
 reset count: 1

switch [default: master] (config) #
```

### Slave Example

```
switch [default: master] (config) # show chassis ha
2-node HA state:
 Box management IP: 172.30.1.200/16
 interface: mgmt0

 local role: slave
 local slot: 2
 other state: active
 reset count: 0

switch [default: master] (config) #
```



Not following these instructions may result in some errors in the log. These errors may be safely ignored.

## 4.16.6 System Reboot

### 4.16.6.1 Rebooting 1U Switches

➤ **To reboot a 1U switch system:**

**Step 1.** Enter Config mode. Run:

```
switch >
switch > enable
switch # configure terminal
```

**Step 2.** Reboot the system. Run:

```
switch (config) # reload
```

### 4.16.6.2 Rebooting Director Switches

Mellanox high end management SX65xx systems support redundant management modules. Chassis HA reduces downtime as it assures continuity of the work even when a management module dies. Chassis HA management allows the systems administrator to associate a single IP address with the appliance. Connecting to that IP address allows the user to change and review the system's chassis parameters regardless of the active management module.



➤ **To reboot director switches:**

**Step 1.** Connect to BIP. Please refer to [Section 4.16.5.3, “Box IP Centralized Location,”](#) on page 391 for more information.

**Step 2.** Enter Config mode. Run:

```
switch >
switch > enable
switch # configure terminal
```

**Step 3.** Reboot the slave management. Run:

```
switch [default: master] (config) # chassis ha reset other
switch [default: master] (config) #
```

**Step 4.** Reboot the master management. Run:

```
switch [default: master] (config) # reload
```

## 4.16.7 Commands

### 4.16.7.1 Chassis Management

#### clear counters

**clear counters [all | interface <type> <number>]**

Clears switch counters.

|                           |                                  |                             |
|---------------------------|----------------------------------|-----------------------------|
| <b>Syntax Description</b> | all                              | Clears all switch counters. |
|                           | type                             | A specific interface type   |
|                           | number                           | The interface number.       |
| <b>Default</b>            | N/A                              |                             |
| <b>Configuration Mode</b> | Config Interface Port Channel    |                             |
| <b>History</b>            | 3.2.3000                         |                             |
| <b>Role</b>               | admin                            |                             |
| <b>Example</b>            | switch (config) # clear counters |                             |
| <b>Related Commands</b>   |                                  |                             |
| <b>Note</b>               |                                  |                             |

## health

**health {max-report-len <length> | re-notif-cntr <counter> | report-clear}**

Configures health daemon settings.

|                           |                                                                 |                                                                                             |
|---------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | max-report-len <length>                                         | Sets the length of the health report - number of line entries. Possible values: 10-2048.    |
|                           | re-notif-cntr <counter>                                         | Health control changes notification counter, in seconds. Possible values: 120-7200 seconds. |
|                           | report-clear                                                    | Clears the health report.                                                                   |
| <b>Default</b>            | max-report-len: 50<br>re-notif-cntr:                            |                                                                                             |
| <b>Configuration Mode</b> | Config                                                          |                                                                                             |
| <b>History</b>            | 3.1.0000                                                        |                                                                                             |
| <b>Role</b>               | admin                                                           |                                                                                             |
| <b>Example</b>            | switch (config) # health re-notif-cntr 125<br>switch (config) # |                                                                                             |
| <b>Related Commands</b>   | show health-report                                              |                                                                                             |
| <b>Note</b>               |                                                                 |                                                                                             |

## power enable

**power enable <module name>**  
**no power enable <module name>**

Powers on the module.  
 The no form of the command shuts down the module.

|                           |                                                                 |                                    |
|---------------------------|-----------------------------------------------------------------|------------------------------------|
| <b>Syntax Description</b> | module name                                                     | Enables power for selected module. |
| <b>Default</b>            | Power is enabled on all modules.                                |                                    |
| <b>Configuration Mode</b> | Config                                                          |                                    |
| <b>History</b>            | 3.1.0000                                                        |                                    |
| <b>Role</b>               | admin                                                           |                                    |
| <b>Example</b>            | <pre>switch (config) # power enable L01 switch (config) #</pre> |                                    |
| <b>Related Commands</b>   | <pre>show power show power consumers</pre>                      |                                    |
| <b>Note</b>               | This command is not applicable for 1U systems.                  |                                    |

## power-management width

**power-management width {auto | force}**  
**no power-management width**

Sets the width of the interface to be automatically adjusted.  
 The no form of the command disables power-saving.

|                           |                                                                                     |                                                                                        |
|---------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | auto                                                                                | Allows the system to automatically decide whether to work in power-saving mode or not. |
|                           | force                                                                               | Forces power-saving mode on the port.                                                  |
| <b>Default</b>            | Disabled                                                                            |                                                                                        |
| <b>Configuration Mode</b> | Config Interface IB<br>Config Interface Ethernet                                    |                                                                                        |
| <b>History</b>            | 3.3.4000                                                                            |                                                                                        |
| <b>Role</b>               | admin                                                                               |                                                                                        |
| <b>Example</b>            | switch (config interface ib 1/1) # power-management width auto<br>switch (config) # |                                                                                        |
| <b>Related Commands</b>   | show interface                                                                      |                                                                                        |
| <b>Note</b>               |                                                                                     |                                                                                        |

## power redundancy-mode

**power redundancy-mode [combined | grid-redundant | ps-redundant]**

Controls the power supply redundancy mode.

|                           |                                                                                                                                                                                                                                                                |                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | combined                                                                                                                                                                                                                                                       | No redundancy - no alarm threshold.                                                                                                    |
|                           | grid-redundant                                                                                                                                                                                                                                                 | N+N – the alarm threshold will be set to a level, indicating when the power availability falls below power that can support N+N scheme |
|                           | ps-redundant                                                                                                                                                                                                                                                   | N+1 – the alarm threshold will be set to a level, indicating when the power availability falls below power that can support N+1 scheme |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                            |                                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                         |                                                                                                                                        |
| <b>History</b>            | 3.1.0000, 3.2.0000                                                                                                                                                                                                                                             |                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                          |                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # power redundancy-mode combined switch (config) #</pre>                                                                                                                                                                                  |                                                                                                                                        |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                            |                                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The difference between the modes sets the threshold for power supply redundancy failure. It does not change any power supply configuration.</li> <li>This command is not applicable for 1U or blade systems.</li> </ul> |                                                                                                                                        |

## usb eject

### usb eject

Gracefully turns off the USB interface.

|                           |                                                  |
|---------------------------|--------------------------------------------------|
| <b>Syntax Description</b> | N/A                                              |
| <b>Default</b>            | N/A                                              |
| <b>Configuration Mode</b> | Config                                           |
| <b>History</b>            | 3.1.0000                                         |
| <b>Role</b>               | admin                                            |
| <b>Example</b>            | switch (config) # usb eject<br>switch (config) # |
| <b>Related Commands</b>   | N/A                                              |
| <b>Note</b>               | Applicable only for systems with USB interface.  |

## show fan

### show fan

Displays fans status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Example</b>            | <pre>switch (config) # show fan switch (config) # show fan ===== Module           Device           Fan  Speed      Status               (RPM) ===== FAN              FAN              F1   5340.00    OK FAN              FAN              F2   5340.00    OK FAN              FAN              F3   5640.00    OK FAN              FAN              F4   5640.00    OK PS1              FAN              F1   5730.00    OK PS2              FAN              -    -          NOT PRESENT switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



## show version

### show version

Displays version information for the currently running system image.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre> switch (config) # show version Product name:      MLNX-OS Product release:   3.1.0000 Build ID:          #1-dev Build date:        2012-02-26 08:47:51 Target arch:       ppc Target hw:         m460ex Built by:          root@r-fit16  Uptime:            1d 3h 32m 24.656s  Product model:     ppc Host ID:           0002c911a15e System memory:     110 MB used / 1917 MB free / 2027 MB total Swap:              0 MB used / 0 MB free / 0 MB total Number of CPUs:    1 CPU load averages: 0.18 / 0.19 / 0.16 switch (config) # </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## show version concise

### show version concise

Displays concise version information for the currently running system image.

|                           |                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                              |
| <b>Default</b>            | N/A                                                                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                         |
| <b>Role</b>               | admin                                                                                                            |
| <b>Example</b>            | switch (config) # show version concise<br>SX_PPC_M460EX SX_3.4.0000 2014-10-14 20:26:41 ppc<br>switch (config) # |
| <b>Related Commands</b>   | N/A                                                                                                              |
| <b>Note</b>               |                                                                                                                  |

## show uboot

### show uboot

Displays u-boot version.

|                           |                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                |
| <b>Default</b>            | N/A                                                                                                                                                |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                   |
| <b>History</b>            | 3.3.5006                                                                                                                                           |
|                           | 3.4.1110 Updated output                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                              |
| <b>Example</b>            | <pre>switch (config) # show uboot UBOOT version : U-Boot 2009.01 SX_PPC_M460EX SX_3.2.0330-82 ppc (Dec 20 2012 - 17:53:54) switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                    |

## show cpld

### show cpld

Displays status of all CPLDs in the system.

|                           |                                                                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                   |
|                           | 3.3.4302 Updated example                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # show cpld ===== Name           Type           Version ===== Cpld1          CPLD_T0R       4 Cpld2          CPLD_PORT1     2 Cpld3          CPLD_PORT2     2 Cpld4          CPLD_MEZZ      3 switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                            |

## show inventory

### show inventory

Displays system inventory.

| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------|--------|---------------|--------------|-----|------|--------|---------------|--------------|---|-----|------------|----------|--------------|-----|-----|-----------|----------|--------------|-----|-----|-----|------------|--------------|-----|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| Example            | <div>switch (config) # show inventory</div> <div>=====</div> <table><tr><th>Module</th><th>Type</th><th>Part number</th><th>Serial Number</th><th>Asic revision</th></tr><tr><td>CHASSIS</td><td>SX1036</td><td>MSX1036B-1SFR</td><td>MT1205X01549</td><td>N/A</td></tr><tr><td>MGMT</td><td>SX1036</td><td>MSX1036B-1SFR</td><td>MT1205X01549</td><td>0</td></tr><tr><td>FAN</td><td>SXX0XX_FAN</td><td>MSX60-FF</td><td>MT1206X07209</td><td>N/A</td></tr><tr><td>PS1</td><td>SXX0XX_PS</td><td>MSX60-PF</td><td>MT1206X06697</td><td>N/A</td></tr><tr><td>CPU</td><td>CPU</td><td>SA000203-B</td><td>MT1220X01231</td><td>N/A</td></tr></table> <div>switch (config) #</div> | Module        | Type          | Part number   | Serial Number | Asic revision | CHASSIS | SX1036 | MSX1036B-1SFR | MT1205X01549 | N/A | MGMT | SX1036 | MSX1036B-1SFR | MT1205X01549 | 0 | FAN | SXX0XX_FAN | MSX60-FF | MT1206X07209 | N/A | PS1 | SXX0XX_PS | MSX60-PF | MT1206X06697 | N/A | CPU | CPU | SA000203-B | MT1220X01231 | N/A |
| Module             | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Part number   | Serial Number | Asic revision |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| CHASSIS            | SX1036                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MSX1036B-1SFR | MT1205X01549  | N/A           |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| MGMT               | SX1036                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MSX1036B-1SFR | MT1205X01549  | 0             |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| FAN                | SXX0XX_FAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MSX60-FF      | MT1206X07209  | N/A           |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| PS1                | SXX0XX_PS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MSX60-PF      | MT1206X06697  | N/A           |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| CPU                | CPU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SA000203-B    | MT1220X01231  | N/A           |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| Related Commands   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |               |               |               |               |         |        |               |              |     |      |        |               |              |   |     |            |          |              |     |     |           |          |              |     |     |     |            |              |     |

## show module

### show module

Displays modules status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000 First version<br>3.3.0000 Added “Is Fatal” column                                                                                                                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # show module ===== Module   Type                Present Power Is Fatal ===== MGMT     SX1036               1      N/A   Not Fatal FAN      SXX0XX_FAN           1      N/A   Not Fatal PS1      SXX0XX_PS            1      N/A   Not Fatal PS2      SXX0XX_PS            0      N/A   Not Fatal CPU      CPU                  1      N/A   Not Fatal switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                     |

## show memory

### show memory

Displays memory status.

|                           |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # show memory Total      Used      Free      Used+B/C  Free-B/C Physical  2027 MB    761 MB    1266 MB   1214 MB    813 MB Swap        0 MB      0 MB      0 MB Physical Memory Borrowed for System Buffers and Cache:   Buffers:                0 MB   Cache:                   452 MB   Total Buffers/Cache:     452 MB switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                        |

## show asic-version

### show asic-version

Displays firmware ASIC version.

|                           |                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # show asic-version ===== SX module          Version ===== SX                  9.1.1260 switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                  |
| <b>Note</b>               |                                                                                                                                      |



## show power

### show power

Displays power supplies and power usage.

| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|---------------------|------------------|---------------------|---------------|--------|-----|------|-------|------|------|---|----|-----|--------|-------|------|------|---|----|-----|------|-------|------|------|---|----|-----|---|---|---|-------------|--|--|-----|-------|-------|------|------|---|----|-----|---|---|---|-------------|--|--|-----|---|---|---|-------------|--|--|-----|---|---|---|-------------|--|--|-----|---|---|---|-------------|--|--|------|---|---|---|-------------|--|--|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| Example            | <pre>switch (config) # show power</pre> <pre>=====</pre> <table><tr><th>Module</th><th>Power<br/>(Watts)</th><th>Voltage</th><th>Current<br/>(Amp)</th><th>Capacity<br/>(Watts)</th><th>Grid<br/>Group</th><th>Status</th></tr><tr><td>PS1</td><td>0.00</td><td>47.11</td><td>0.00</td><td>1008</td><td>A</td><td>OK</td></tr><tr><td>PS2</td><td>248.82</td><td>48.05</td><td>5.18</td><td>1008</td><td>A</td><td>OK</td></tr><tr><td>PS3</td><td>0.00</td><td>46.88</td><td>0.00</td><td>1008</td><td>A</td><td>OK</td></tr><tr><td>PS4</td><td>-</td><td>-</td><td>-</td><td>NOT PRESENT</td><td></td><td></td></tr><tr><td>PS5</td><td>46.72</td><td>47.82</td><td>0.98</td><td>1008</td><td>A</td><td>OK</td></tr><tr><td>PS6</td><td>-</td><td>-</td><td>-</td><td>NOT PRESENT</td><td></td><td></td></tr><tr><td>PS7</td><td>-</td><td>-</td><td>-</td><td>NOT PRESENT</td><td></td><td></td></tr><tr><td>PS8</td><td>-</td><td>-</td><td>-</td><td>NOT PRESENT</td><td></td><td></td></tr><tr><td>PS9</td><td>-</td><td>-</td><td>-</td><td>NOT PRESENT</td><td></td><td></td></tr><tr><td>PS10</td><td>-</td><td>-</td><td>-</td><td>NOT PRESENT</td><td></td><td></td></tr></table> <pre>=====</pre> <pre>Total power used : 295.54 W Total power capacity : 4032.00 W Total power budget : 4032.00 W Total power available : 3736.46 W Redundancy mode: combined Redundancy status: OK switch (config) #</pre> | Module  | Power<br>(Watts) | Voltage             | Current<br>(Amp) | Capacity<br>(Watts) | Grid<br>Group | Status | PS1 | 0.00 | 47.11 | 0.00 | 1008 | A | OK | PS2 | 248.82 | 48.05 | 5.18 | 1008 | A | OK | PS3 | 0.00 | 46.88 | 0.00 | 1008 | A | OK | PS4 | - | - | - | NOT PRESENT |  |  | PS5 | 46.72 | 47.82 | 0.98 | 1008 | A | OK | PS6 | - | - | - | NOT PRESENT |  |  | PS7 | - | - | - | NOT PRESENT |  |  | PS8 | - | - | - | NOT PRESENT |  |  | PS9 | - | - | - | NOT PRESENT |  |  | PS10 | - | - | - | NOT PRESENT |  |  |
| Module             | Power<br>(Watts)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Voltage | Current<br>(Amp) | Capacity<br>(Watts) | Grid<br>Group    | Status              |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS1                | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 47.11   | 0.00             | 1008                | A                | OK                  |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS2                | 248.82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 48.05   | 5.18             | 1008                | A                | OK                  |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS3                | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 46.88   | 0.00             | 1008                | A                | OK                  |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS4                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -       | -                | NOT PRESENT         |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS5                | 46.72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 47.82   | 0.98             | 1008                | A                | OK                  |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS6                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -       | -                | NOT PRESENT         |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS7                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -       | -                | NOT PRESENT         |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS8                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -       | -                | NOT PRESENT         |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS9                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -       | -                | NOT PRESENT         |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| PS10               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -       | -                | NOT PRESENT         |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| Related Commands   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |                  |                     |                  |                     |               |        |     |      |       |      |      |   |    |     |        |       |      |      |   |    |     |      |       |      |      |   |    |     |   |   |   |             |  |  |     |       |       |      |      |   |    |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |     |   |   |   |             |  |  |      |   |   |   |             |  |  |

## show power consumers

### show power consumers

Displays power consumers.

|                           |     |
|---------------------------|-----|
| <b>Syntax Description</b> | N/A |
|---------------------------|-----|

|                |     |
|----------------|-----|
| <b>Default</b> | N/A |
|----------------|-----|

|                           |                  |
|---------------------------|------------------|
| <b>Configuration Mode</b> | Any Command Mode |
|---------------------------|------------------|

|                |          |
|----------------|----------|
| <b>History</b> | 3.1.0000 |
|----------------|----------|

|             |       |
|-------------|-------|
| <b>Role</b> | admin |
|-------------|-------|

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Example</b> | <pre>switch (config) # show power consumers ===== Module           Power      Voltage   Current   Status       (Watts) ===== MGMT              17.47      48.00     0.36      OK S01               33.26      48.00     0.69      OK S02               33.50      48.00     0.70      OK L01               31.73      48.00     0.66      OK L02               29.76      48.00     0.62      OK L30               28.61      48.00     0.60      OK FAN5              14.91      48.00     0.31      OK FAN2              13.70      48.00     0.29      OK FAN1              14.21      48.00     0.30      OK FAN6              15.10      48.00     0.31      OK FAN4              14.53      48.00     0.30      OK FAN7              15.04      48.00     0.31      OK FAN3              15.17      48.00     0.32      OK FAN8              14.98      48.00     0.31      OK  Total power used : 291.97 W Max power : 1636.00 W switch (config) #</pre> |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |     |
|-------------------------|-----|
| <b>Related Commands</b> | N/A |
|-------------------------|-----|

|             |  |
|-------------|--|
| <b>Note</b> |  |
|-------------|--|

## show temperature

### show temperature

Displays the system's temperature sensors status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # show temperature ===== Module  Component                Reg  CurTemp  Status                                (Celsius) ===== MGMT    BOARD_MONITOR             T1    25.00    OK MGMT    CPU_BOARD_MONITOR          T1    26.00    OK MGMT    CPU_BOARD_MONITOR          T2    41.00    OK MGMT    QSFP_TEMP1                 T1    23.00    OK MGMT    QSFP_TEMP2                 T1    22.50    OK MGMT    QSFP_TEMP3                 T1    23.00    OK MGMT    SX                         T1    37.00    OK switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## show voltage

### show voltage

Displays power supplies voltage level.

|                    |                                |                   |                 |                  |                |        |            |           |
|--------------------|--------------------------------|-------------------|-----------------|------------------|----------------|--------|------------|-----------|
| Syntax Description | N/A                            |                   |                 |                  |                |        |            |           |
| Default            | N/A                            |                   |                 |                  |                |        |            |           |
| Configuration Mode | Any Command Mode               |                   |                 |                  |                |        |            |           |
| History            | 3.1.0000                       |                   |                 |                  |                |        |            |           |
|                    | 3.3.5006 Updated Example       |                   |                 |                  |                |        |            |           |
| Role               | admin                          |                   |                 |                  |                |        |            |           |
| Example            | switch (config) # show voltage |                   |                 |                  |                |        |            |           |
|                    | =====                          |                   |                 |                  |                |        |            |           |
|                    | Module                         | Power Meter       | Reg             | Expected Voltage | Actual Voltage | Status | High Range | Low Range |
|                    | =====                          |                   |                 |                  |                |        |            |           |
|                    | MGMT                           | BOARD_MONITOR     | USB 5V sensor   | 5.00             | 5.15           | OK     | 5.55       | 4.45      |
|                    | MGMT                           | BOARD_MONITOR     | Asic I/O sensor | 2.27             | 2.11           | OK     | 2.55       | 1.99      |
|                    | MGMT                           | BOARD_MONITOR     | 1.8V sensor     | 1.80             | 1.79           | OK     | 2.03       | 1.57      |
|                    | MGMT                           | BOARD_MONITOR     | SYS 3.3V sensor | 3.30             | 3.28           | OK     | 3.68       | 2.92      |
|                    | MGMT                           | BOARD_MONITOR     | CPU 0.9V sensor | 0.90             | 0.93           | OK     | 1.04       | 0.76      |
|                    | MGMT                           | BOARD_MONITOR     | 1.2V sensor     | 1.20             | 1.19           | OK     | 1.37       | 1.03      |
|                    | MGMT                           | CPU_BOARD_MONITOR | 12V sensor      | 12.00            | 11.67          | OK     | 13.25      | 10.75     |
|                    | MGMT                           | CPU_BOARD_MONITOR | 12V sensor      | 2.50             | 2.46           | OK     | 2.80       | 2.20      |
|                    | MGMT                           | CPU_BOARD_MONITOR | 2.5V sensor     | 3.30             | 3.26           | OK     | 3.68       | 2.92      |
|                    | MGMT                           | CPU_BOARD_MONITOR | SYS 3.3V sensor | 3.30             | 3.24           | OK     | 3.68       | 2.92      |
|                    | MGMT                           | CPU_BOARD_MONITOR | SYS 3.3V sensor | 1.80             | 1.79           | OK     | 2.03       | 1.57      |
|                    | MGMT                           | CPU_BOARD_MONITOR | 1.8V sensor     | 1.20             | 1.24           | OK     | 1.37       | 1.03      |
|                    | switch (config) #              |                   |                 |                  |                |        |            |           |
| Related Commands   | N/A                            |                   |                 |                  |                |        |            |           |
| Note               |                                |                   |                 |                  |                |        |            |           |

## show health-report

### show health-report

Displays health report.

|                           |                                                                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000 First version                                                                                                                                                                                                                 |
|                           | 3.3.0000 Output update                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # show health-report =====   ALERTS CONFIGURATION   ===== Re-notification counter (sec):[3600] Report max counter:           [50] =====     HEALTH REPORT     ===== No Health issues file switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                    |
| <b>Note</b>               | Problems with the power supply cannot be monitored on SX1016 switch systems.                                                                                                                                                           |

## show resources

### show resources

Displays system resources.

|                           |                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre> switch (config) # show resources Total      Used      Free Physical  2027 MB    761 MB    1266 MB Swap        0 MB      0 MB      0 MB  Number of CPUs:    1 CPU load averages: 0.11 / 0.23 / 0.23  CPU 1   Utilization:                5%   Peak Utilization Last Hour: 19% at 2012/02/15 13:26:19   Avg. Utilization Last Hour: 7% switch (config) #           </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                               |

## show system profile

### show system profile

Displays system profile.

|                           |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                             |
| <b>Default</b>            | N/A                                                                             |
| <b>Configuration Mode</b> | Any Command Mode                                                                |
| <b>History</b>            | 3.2.0000                                                                        |
| <b>Role</b>               | admin                                                                           |
| <b>Example</b>            | switch (config) # show system profile<br>eth-single-switch<br>switch (config) # |
| <b>Related Commands</b>   | system profile                                                                  |
| <b>Note</b>               |                                                                                 |

## show system capabilities

### show system capabilities

Displays system capabilities.

|                           |                                                                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000 First version                                                                                                                                                                                                                     |
|                           | 3.3.0000 Added gateway support                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # show system capabilities IB: Supported Ethernet: Supported, Full L2 GW: Supported Max number of GW ports: 0 Max SM nodes: 648 IB Max licensed speed: FDR Ethernet Max licensed speed: 56Gb  switch (config) #</pre> |
| <b>Related Commands</b>   | show system profile                                                                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                            |



## show system mac

### show system mac

Displays system MAC address.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | N/A                                                                         |
| <b>Configuration Mode</b> | Any Command Mode                                                            |
| <b>History</b>            | 3.1.0000                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config) # show system mac<br>00:02:C9:5E:AF:18<br>switch (config) # |
| <b>Related Commands</b>   | N/A                                                                         |
| <b>Note</b>               |                                                                             |

## show protocols

### show protocols

Displays all protocols enabled in the system.

|                           |                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                                                                                            |
|                           | 3.3.4550 Updated Example                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # show protocols  Ethernet enabled spanning-tree rstp lacp disabled lldp enabled igmp-snooping disabled ets enabled priority-flow-control disabled sflow disabled openflow enabled  IP routing disabled ospf disabled dhcp-relay disabled  MLAG enabled  Infiniband enabled sm enabled switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                     |

## show bios

### show bios

Displays the bios version information.

|                           |                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                    |
| <b>History</b>            | 3.3.4150                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # show bios BIOS version : 4.6.5 BIOS subversion : Official AMI Release BIOS release date : 07/02/2013 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                     |
| <b>Note</b>               | The command is available only on X86 systems (not on PPC).                                                                                          |

## 4.16.7.2 Chassis High Availability

### chassis ha bip

**chassis ha bip <board IP address>**

Configures Chassis Board IP (BIP).

|                           |                                                                      |                                      |
|---------------------------|----------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | board IP address                                                     | Sets the chassis virtual IP address. |
| <b>Default</b>            | 0.0.0.0                                                              |                                      |
| <b>Configuration Mode</b> | Config                                                               |                                      |
| <b>History</b>            | 3.1.0000                                                             |                                      |
| <b>Role</b>               | admin                                                                |                                      |
| <b>Example</b>            | switch (config) # chassis ha bip 192.168.10.100<br>switch (config) # |                                      |
| <b>Related Commands</b>   | show chassis ha                                                      |                                      |
| <b>Note</b>               | This command is applicable only for SX65xx systems.                  |                                      |

## chassis ha

### chassis ha reset other

Performs a reset to the other management card in the chassis.

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                           |
| <b>Default</b>            | N/A                                                           |
| <b>Configuration Mode</b> | Config                                                        |
| <b>History</b>            | 3.1.0000                                                      |
| <b>Role</b>               | admin                                                         |
| <b>Example</b>            | switch (config) # chassis ha reset other<br>switch (config) # |
| <b>Related Commands</b>   | show chassis ha                                               |
| <b>Note</b>               | This command is applicable only for SX65xx systems.           |

## chassis ha power enable other

**chassis ha power enable other**  
**no chassis ha power enable other**

Enables the other management card in the chassis.  
The no form of the command disables the other management card in the chassis.

|                           |                                                                      |
|---------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                  |
| <b>Default</b>            | The other management card is enabled.                                |
| <b>Configuration Mode</b> | Config                                                               |
| <b>History</b>            | 3.1.0000                                                             |
| <b>Role</b>               | admin                                                                |
| <b>Example</b>            | switch (config) # chassis ha power enable other<br>switch (config) # |
| <b>Related Commands</b>   | show chassis ha                                                      |
| <b>Note</b>               | This command is applicable only for SX65xx systems.                  |

## show chassis ha

### show chassis ha

Displays Chassis HA parameters and status.

|                           |                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # show chassis ha Box management IP: 172.30.1.200/16 interface: mgmt0 local role: master local slot: 1 other state: active reset count: 0 switch (config) #</pre> |
| <b>Related Commands</b>   | chassis ha                                                                                                                                                                             |
| <b>Note</b>               | This command is applicable only for SX65xx systems.                                                                                                                                    |

## 4.17 Network Management Interfaces

### 4.17.1 SNMP

Simple Network Management Protocol (SNMP), is a network protocol for the management of a network and the monitoring of network devices and their functions. SNMP supports asynchronous event (trap) notifications and queries.

MLNX-OS supports:

- SNMP versions v1, v2c and v3
- SNMP trap notifications
- Standard MIBs
- Mellanox private MIBs

#### 4.17.1.1 Standard MIBs

**Table 32 - Standard MIBs – Textual Conventions and Conformance MIBs**

| MIB                             | Standard | Comments |
|---------------------------------|----------|----------|
| INET-ADDRESS-MIB                | RFC-4001 |          |
| SNMPV2-CONF                     |          |          |
| SNMPV2-TC                       | RFC 2579 |          |
| SNMPV2-TM                       | RFC 3417 |          |
| SNMP-USM-AES-MIB                | RFC 3826 |          |
| IANA-LANGUAGE-MIB               | RFC 2591 |          |
| IANA-RTPROTO-MIB                | RFC 2932 |          |
| IANAifType-MIB                  |          |          |
| IANA-ADDRESS-FAMILY-NUMBERS-MIB |          |          |

**Table 33 - Standard MIBs – Structure, Management Interface and General SNMP**

| MIB                     | Standard | Comments             |
|-------------------------|----------|----------------------|
| SNMPv2-MIB              | RFC 3418 |                      |
| SNMP-FRAMEWORK-MIB      | RFC 2571 |                      |
| SNMP-VIEW-BASED-SM-MIB  | RFC 3414 |                      |
| SNMP-VIEW-BASED-ACM-MIB | RFC 3415 |                      |
| SNMP-MPD-MIB            | RFC 2572 |                      |
| IP-MIB                  | RFC 4293 | Management interface |



**Table 33 - Standard MIBs – Structure, Management Interface and General SNMP**

| MIB                                        | Standard | Comments             |
|--------------------------------------------|----------|----------------------|
| TCP-MIB                                    | RFC 4022 | Management interface |
| UDP-MIB                                    | RFC 4113 | Management interface |
| IP-FORWARD-MIB                             | RFC 4292 | Management interface |
| HOST-RESOURCES-MIB,<br>HOST-RESOURCES-TYPE | RFC 2790 | Management interface |

**Table 34 - Standard MIBs – Chassis and Switch**

| MIB               | Standard     | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RFC1213-MIB       | RFC 1213     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| IF-MIB            | RFC 2863     | ifXTable only supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ENTITY-MIB        | RFC 4133     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| ENTITY-SENSOR-MIB | RFC 3433     | Fan and temperature sensors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ENTITY-STATE-MIB  | RFC 4268     | Fan and temperature states                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bridge MIB        | RFC 4188     | dot1dTpFdbGroup and dot1dStaticGroup are not supported in this MIB, it is supported as a part of Q-Bridge-MIB.<br>This MIB is not relevant to InfiniBand.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Q-Bridge MIB      | RFC 4363     | The following SNMP groups are not supported: <ul style="list-style-type: none"> <li>• qBridgeVlanStatisticsGroup,</li> <li>• qBridgeVlanStatisticsOverflowGroup ,</li> <li>• qBridgeVlanHCStatisticsGroup,</li> <li>• qBridgeLearningConstraintsGroup.</li> </ul> The following SNMP tables are not supported: <ul style="list-style-type: none"> <li>• dot1qTpFdbTable (dynamic UC MAC addresses)</li> <li>• dot1qTpGroupTable (dynamic MC MAC addresses)</li> <li>• dot1qForwardAllTable (GMRP)</li> <li>• dot1qForwardUnregisteredTable (GMRP)</li> <li>• dot1qVlanCurrentTable (GVRP)</li> </ul> This MIB is not relevant to InfiniBand. |
| RSTP-MIB          | RFC 4318     | This MIB is not relevant to InfiniBand.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| LLDP-MIB          | 802.1AB-2005 | This MIB is not relevant to InfiniBand.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

### 4.17.1.2 Private MIB

**Table 35 - Private MIBs Supported**

| MIB                    | Description                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| MELLANOX-SMI-MIB       | Mellanox Private MIB main structure (no objects)                                                              |
| MELLANOX-PRODUCTS-MIB  | List of OID – per managed system (sysObjID)                                                                   |
| MELLANOX-IF-VPI-MIB    | IfTable extensions                                                                                            |
| MELLANOX-EFM-MIB       | Partially deprecated MIB (based on Mellanox-MIB)<br>Traps definitions and test trap set scalar are supported. |
| MELLANOX-ENTITY-MIB    | Enhances the standard ENTITY-MIB (contains GUID and ASIC revision).                                           |
| MELLANOX-POWER-CYCLE   | Allows rebooting the switch system                                                                            |
| MELLANOX-SW-UPDATE-MIB | Allows viewing what SW images are installed, uploading and installing new SW images                           |
| MELLANOX-CONFIG-DB     | Allows loading, uploading, or deleting configuration files                                                    |

Mellanox private MIBs can be downloaded from the [Mellanox Support](#) webpage.

### 4.17.1.3 Mellanox Private Traps

The following private traps are supported by MLNX-OS.

**Table 36 - SNMP Traps**

| Trap               | Action Required                                                                                |
|--------------------|------------------------------------------------------------------------------------------------|
| asicChipDown       | Reboot the system.                                                                             |
| asicOverTempReset  | Check fans and environmental temperature.                                                      |
| asicOverTemp       | Check fans and environmental temperature.                                                      |
| lowPower           | Add/connect power supplies.                                                                    |
| internalBusError   | N/A                                                                                            |
| procCrash          | Generate SysDump and contact Mellanox support.                                                 |
| cpuUtilHigh        | N/A                                                                                            |
| procUnexpectedExit | Generate SysDump and contact Mellanox support.                                                 |
| diskSpaceLow       | Clean images and sysDump files using the commands “image delete” and “file debug-dump delete”. |
| systemHealthStatus | Refer to Health Status table.                                                                  |
| lowPowerRecover    | N/A                                                                                            |
| insufficientFans   | Check Fans and environmental conditions.                                                       |

**Table 36 - SNMP Traps**

| Trap                     | Action Required                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------|
| insufficientFansRecover  | N/A                                                                                         |
| insufficientPower        | Add/connect power supplies, or change power mode using the command “power redundancy mode”. |
| insufficientPowerRecover | N/A                                                                                         |

For additional information refer to MELLANOX-EFM-MIB.



For event-to-MIB mapping, please refer to [Table 27, “Supported Event Notifications and MIB Mapping,”](#) on page 271.

#### 4.17.1.4 Configuring SNMP

##### ➤ *To set up the SNMP:*

- Step 1.** Activate the SNMP server on the MLNX-OS switch (in configure mode) using the following commands:



Community strings are case sensitive.



Director switches (SX65xx systems) require SNMP timeout configuration on the agent of 60 seconds.

```
switch (config) # snmp-server enable
switch (config) # snmp-server enable notify
switch (config) # snmp-server community public ro
switch (config) # snmp-server contact "contact name"
switch (config) # snmp-server host <host IP address> traps version 2c public
switch (config) # snmp-server location "location name"
switch (config) # snmp-server user admin v3 enable
switch (config) # snmp-server user admin v3 prompt auth md5 priv des
```

#### 4.17.1.5 Configuring an SNMPv3 User

##### ➤ *To configure SNMP V3 user:*

- Step 1.** Configure the user using the command:

```
switch (config) # snmp-server user [role] v3 prompt auth <hash type> priv <privacy type>
```

where

- user role – admin

- auth type – md5 or sha
- priv type – des or aes-128

**Step 2.** Enter authentication password and its confirmation.

**Step 3.** Enter privacy password and its confirmation.

```
switch (config) # snmp-server user admin v3 prompt auth md5 priv des
Auth password: *****
Confirm: *****
Privacy password: *****
Confirm: *****
switch (config) #
```

To retrieve the system table, run the following SNMP command:

```
snmpwalk -v3 -l authPriv -a MD5 -u admin -A "<Authentication password>" -x DES -X "<privacy password>" <system ip> SNMPv2-MIB::system
```

#### 4.17.1.6 Configuring an SNMP Notification

➤ **To set up the SNMP Notification (traps or informs):**

**Step 1.** Make sure SNMP and SNMP notification are enable. Run:

```
switch (config) # snmp-server enable
switch (config) # snmp-server enable notify
switch (config) #
```

**Step 2.** Configure SNMP host with the desired arguments (IP Address, SNMP version, authentication methods). More than one host can be configured. Each host may have different attributes. Run:

```
switch (config) # snmp-server host 10.134.47.3 traps version 3 user my-username auth sha
my-password
switch (config) #
```

**Step 3.** Verify the SNMP host configuration. Run:

```
switch (config) # show snmp host
Notifications enabled: yes
Default notification community: public
Default notification port: 162

Notification sinks:

 10.134.47.3
 Enabled: yes
 Port: 162 (default)
 Notification type: SNMP v3 trap
 Username: my-username
 Authentication type: sha
 Privacy type: aes-128
 Authentication password: (set)
 Privacy password: (set)

switch (config) #
```

**Step 4.** Configure the desired event to be sent via SNMP. Run:

```
switch (config) # snmp-server notify event interface-up
switch (config) #
```



This particular event is used as an example only.

**Step 5.** Verify the list of traps and informs being sent to out of the system. Run:

```
switch (config) # show snmp events
Events for which traps will be sent:
asic-chip-down: ASIC (Chip) Down
cpu-util-high: CPU utilization has risen too high
disk-space-low: Filesystem free space has fallen too low
health-module-status: Health module Status
insufficient-fans: Insufficient amount of fans in system
insufficient-fans-recover: Insufficient amount of fans in system recovered
insufficient-power: Insufficient power supply
interface-down: An interface's link state has changed to down
interface-up: An interface's link state has changed to up
internal-bus-error: Internal bus (I2C) Error
liveness-failure: A process in the system was detected as hung
low-power: Low power supply
low-power-recover: Low power supply Recover
new_root: local bridge became a root bridge
paging-high: Paging activity has risen too high
power-redundancy-mismatch: Power redundancy mismatch
process-crash: A process in the system has crashed
process-exit: A process in the system unexpectedly exited
snmp-authtrap: An SNMP v3 request has failed authentication
topology_change: local bridge triggered a topology change
unexpected-shutdown: Unexpected system shutdown
switch (config) #
```



To print event notifications to the terminal (SSH or CONSOLE) refer to [Section 4.8.1, “Monitor,”](#) on page 232.

#### 4.17.1.7 SNMP SET Operations

MLNX-OS allows the user to use SET operations via SNMP interface. This is needed to configure a user/community supporting SET operations.

##### Enabling SNMP SET

➤ **To allow SNMP SET operations using SNMPv1/v2:**

**Step 1.** Enable SNMP communities. Run:

```
switch (config) # snmp-server enable communities
```

**Step 2.** Configure a read-write community. Run:

```
switch (config) # snmp-server community my-community-name rw
```

**Step 3.** Make sure SNMP communities are enabled (enabled by default). Make sure “(DISABLED)” does not appear beside “Read-only communities” / “Read-write communities”. Run:

```
switch (config) # show snmp
SNMP enabled: yes
SNMP port: 161
System contact:
System location:
Read-only communities:
 public

Read-write communities:
 my-community-name
switch (config) # show snmp
No Listen Interfaces.
```

**Step 4.** Configure this RW community in your MIB browser.

➤ **To allow SNMP SET operations using SNMPv3:**

**Step 1.** Create an SNMPv3 user. Run:

```
switch (config) # snmp-server user myuser v3 auth sha <password1> priv aes-128 <pass-
word2>
```



It is possible to use other configuration options not specified in the example above. Please refer to the command “[snmp-server user](#)” on [page 445](#) for more information.

**Step 2.** Make sure the username is enabled for SET access and has admin capability level. Run:

```
switch (config) # show snmp user
User name: myuser
 Enabled overall: yes
 Authentication type: sha
 Privacy type: aes-128
 Authentication password: (set)
 Privacy password: (set)
 Require privacy: yes
 SET access:
 Enabled: yes
 Capability level: admin
```

MLNX-OS supports the OIDs for SET operation listed in Table 37 which are expanded upon in the following subsections.

**Table 37 - Supported SET OIDs**

| MIB Name         | OID Name        | OID                           |
|------------------|-----------------|-------------------------------|
| MELLANOX-EFM-MIB | sendTestTrapSet | 1.3.6.1.4.1.33049.2.1.1.1.6.0 |

**Table 37 - Supported SET OIDs**

| MIB Name             | OID Name                          | OID                            |
|----------------------|-----------------------------------|--------------------------------|
| SNMPv2-MIB           | sysName                           | 1.3.6.1.2.1.1.5.0              |
| MELLANOX-CONFIG-DB   | mellanoxConfigDBCcmdExecute       | 1.3.6.1.4.1.33049.12.1.1.2.3.0 |
|                      | mellanoxConfigDBCcmdFilename      | 1.3.6.1.4.1.33049.12.1.1.2.2.0 |
|                      | mellanoxConfigDBCcmdStatus        | 1.3.6.1.4.1.33049.12.1.1.2.4.0 |
|                      | mellanoxConfigDBCcmdStatusString  | 1.3.6.1.4.1.33049.12.1.1.2.5.0 |
|                      | mellanoxConfigDBCcmdUri           | 1.3.6.1.4.1.33049.12.1.1.2.1.0 |
| MELLANOX-POWER-CYCLE | mellanoxPowerCycleCmdExecute      | 1.3.6.1.4.1.33049.10.1.1.2.1.0 |
|                      | mellanoxPowerCycleCmdStatus       | 1.3.6.1.4.1.33049.10.1.1.2.2.0 |
|                      | mellanoxPowerCycleCmdStatusString | 1.3.6.1.4.1.33049.10.1.1.2.3.0 |
| MELLANOX-SW-UPDATE   | mellanoxSWUpdateCmdSetNext        | 1.3.6.1.4.1.33049.11.1.1.2.1.0 |
|                      | mellanoxSWUpdateCmdUri            | 1.3.6.1.4.1.33049.11.1.1.2.2.0 |
|                      | mellanoxSWUpdateCmdExecute        | 1.3.6.1.4.1.33049.11.1.1.2.3.0 |
|                      | mellanoxSWUpdateCmdStatus         | 1.3.6.1.4.1.33049.11.1.1.2.4.0 |
|                      | mellanoxSWUpdateCmdStatusString   | 1.3.6.1.4.1.33049.11.1.1.2.5.0 |
|                      | mellanoxSWActivePartition         | 1.3.6.1.4.1.33049.11.1.1.3.0.0 |
|                      | mellanoxSWNextBootPartition       | 1.3.6.1.4.1.33049.11.1.1.4.0.0 |

**Sending a Test Trap SET Request**

MLNX-OS allows the user to use test the notification mechanism via SNMP SET. Sending a SET request with the designated OID triggers a test trap.

**Prerequisites:**

1. Enable SET operations by following the instructions in [Section , “Enabling SNMP SET,” on page 429.](#)
2. Configure host to which to send SNMP notifications.
3. Set a trap receiver in the MIB browser.

**➤ To send a test trap:**

**Step 1.** Send a SET request to the switch IP with the OID 1.3.6.1.4.1.33049.2.1.1.6.0.

**Step 2.** Make sure the test trap is received by the aforementioned trap receiver (OID: 1.3.6.1.4.1.33049.2.1.2.13).

**Setting Hostname with SNMP**

Mellanox supports setting system hostname using an SNMP SET request as described in SNMPv2-MIB (sysName, OID: 1.3.6.1.2.1.1.5.0).

The restrictions on setting a hostname via CLI also apply to setting a hostname through SNMP. Refer to the command [“hostname” on page 133](#) for more information.

**Power Cycle with SNMP**

Mellanox supports power cycling its systems using an SNMP SET request as described in MELLANOX-POWER-CYCLE MIB.

Power cycle command is issued via the OID `mellanoxPowerCycleCmdExecute`. The following options are available:

- Reload – saves any unsaved configuration and reloads the switch

- Reload discard – reboots the system and discards of any unsaved changes
- Reload force – forces an expedited reload on the system even if it is busy without saving unsaved configuration (equals the CLI command `reload force`)
- Reload slave – reloads the slave management on dual management systems (must be executed from the master management module)



On dual management systems it is advised to connect via the BIP to make sure commands are executed from the master management.

### Changing Configuration with SNMP

Mellanox supports making configuration changes on its systems using SNMP SET requests. Configuration requests are performed by setting several values (arguments) and then executing a command by setting the value for the relevant operation.

It is possible to set the parameters and execute the commands on the same SNMP request or separate them to several SET operations. Upon executing a command, the values of its arguments remain and can be read using GET commands.

Once a command is executed there may be two types of errors:

- Immediate: This error results in a failure of the SNMP request. This means a critical error in the SNMP request has occurred or that a previous SET request is being executed
- Delayed: The SET request has been accepted by the switch but an error occurred during its execution.

For example, when performing a fetch (download) operation, an immediate error can occur when the given URL is invalid. A delayed error can occur if the download process fails due to network connectivity issues.

The following parameters are arguments are supported:

- Command URI – URI to fetch the configuration file from or upload the file to (for supported URI format please refer to the CLI command “configuration fetch” for more details)
- Config file name – filename to save the configuration file to or to upload to remote location

The following commands are supported:

- BinarySwitchTo – replaces the configuration file with a new binary configuration file. This option fetches the configuration file from the URI provided in the `mellanoxConfigDBCmdUri` and switches to that configuration file. This command should be preceded by a reload command in order for the new configuration to apply.
- TextApply – fetches a configuration file in human-readable format and applies its configuration upon the current configuration.
- BinaryUpload – uploads a binary format configuration file of the current running configuration or an existing configuration file on the switch to the URI in the `mellanoxConfigDBCmdUri` command. The filename parameter indicates what configuration file on the switch to upload.



- **TextUpload** – uploads a human-readable configuration file of the current running configuration or an existing configuration file on the switch to the URI in the `mellanoxConfigDBCmdUri` command. The `filename` parameter indicates what configuration file on the switch to upload.
- **ConfigWrite** – saves active configuration to a filename on the switch as given in the `filename` parameter. In case filename is “active”, active configuration is saved to the current saved configuration (same as the CLI command `configuration write`).

#### Upgrading MLNX-OS Software with SNMP

Mellanox supports upgrading MLNX-OS software using an SNMP SET request as described in MELLANOX-SW-UPDATE MIB.

The software upgrade command is issued via the OID `mellanoxSWUpdateCmdExecute`. The following options are available:

- **Update** – fetches the image from a specified URI (equivalent to the command “`image fetch`” followed by “`image install`”)

The image to update from is defined by the OID `mellanoxSWUpdateCmdUri`. The restrictions on the URI are identical to what is supported in the CLI command “`image fetch`” on page 195.

- **Set-Next** – changes the image for the next boot equivalent to the CLI command “`image boot`”)

The partition from which to boot is defined by the OID `mellanoxSWUpdateCmdSetNext`. The parameters for this OID are as follows:

- 0 – no change
- 1 – partition 1
- 2 – partition 2
- 3 – next partition (default)

Using the OIDs `mellanoxSWUpdateCmdStatus` and `mellanoxSWUpdateCmdStatusString` you may view the status of the latest operation performed from the aforementioned in either integer values, or human-readable forms, respectively. The integer values presented may be as follows:

- 0 – no operation
- 1-100 – progress%
- 101 – success
- 200 – failure

#### 4.17.1.8 IF-MIB and Interface Information

MLNX-OS supports displaying information of switch ports, LAG ports, MLAG ports and VLAN interfaces on all systems via SNMP interface. This feature is enabled by default. The interface information is available in the `ifTables`, `ifXTable` and `mellanoxIfVPITable`. Additionally, traps for interface up/down, and internal link suboptimal speed are enabled. The user has the ability to enable one or both of these traps.

Interface up/down traps are sent whenever there is a change in the interface’s operational state. These traps are suppressed for internal links when the internal link’s speed does not match the configured speed of the link (mismatch condition).

### 4.17.2 XML API

MLNX-OS XML API is currently under development. For further information please contact Mellanox support.

## 4.17.3 Commands

### 4.17.3.1 SNMP

The commands in this section are used to manage the SNMP server.

#### snmp-server auto-refresh

**snmp-server auto-refresh {enable | interval <time>}**  
**no snmp-server auto-refresh enable**

Configures SNMPD refresh settings.  
 The no form of the command disables SNMPD refresh mechanism.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                                                | Enables SNMPD refresh mechanism.       |
|                           | interval                                                                                                                                                                                                                                                                                                                                                                                                                              | Sets SNMPD refresh interval.           |
|                           | time                                                                                                                                                                                                                                                                                                                                                                                                                                  | In seconds. Range: 20-500.             |
| <b>Default</b>            | Enabled.<br>Interval: 60 secs                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
|                           | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                              | Added time parameter and updated notes |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |
| <b>Example</b>            | switch (config) # snmp-server auto-refresh interval 120                                                                                                                                                                                                                                                                                                                                                                               |                                        |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When configuring an interval lower than 60 seconds, the following warning message appears asking for confirmation: "Warning: this configuration may increase CPU utilization, Type 'YES' to confirm: YES".</li> <li>When disabling SNMP auto-refresh, information is retrieved no more than once every 60 seconds just like SNMP tables that do not have an auto-refresh mechanism.</li> </ul> |                                        |

## snmp-server community

**snmp-server community <community> [ ro | rw]**

**no snmp-server community <community>**

Sets a community name for either read-only or read-write SNMP requests.  
The no form of the command sets the community string to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                       |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Syntax Description</b> | community                                                                                                                                                                                                                                                                                                                                                                                                            | Community name.                       |
|                           | ro                                                                                                                                                                                                                                                                                                                                                                                                                   | Sets the read-only community string.  |
|                           | rw                                                                                                                                                                                                                                                                                                                                                                                                                   | Sets the read-write community string. |
| <b>Default</b>            | Read-only community: "public"<br>Read-write community: ""                                                                                                                                                                                                                                                                                                                                                            |                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                               |                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                             |                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |
| <b>Example</b>            | <pre> switch(config) # snmp-server community private rw switch (config) # show snmp SNMP enabled:      yes SNMP port:         161 System contact: System location: Read-only community: public Read-write community: private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:      yes Default trap community: public Default trap port:  162  No trap sinks configured. switch(config) # </pre> |                                       |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                            |                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>If neither the "ro" or the "rw" parameters are specified, the read-only community is set as the default community</li> <li>If the read-only community is specified, only queries can be performed</li> <li>If the read-write community is specified, both queries and sets can be performed</li> </ul>                                                                        |                                       |

## snmp-server contact

**snmp-server contact <contact name>**

**no snmp-server contact**

Sets a value for the sysContact variable in MIB-II.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Syntax Description</b> | contact name                                                                                                                                                                                                                                                                                                                                                                                                                                      | Contact name. |
| <b>Default</b>            | ""                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |
| <b>Example</b>            | <pre>switch (config) # snmp-server contact my-name switch (config) # show snmp SNMP enabled:          yes SNMP port:             161 System contact:        my-name System location: Read-only community:   public Read-write community:  private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:          yes Default trap community: public Default trap port:      162  No trap sinks configured. switch (config) #</pre> |               |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |

## snmp-server enable

**snmp-server enable [communities | mult-communities | notify]**  
**no snmp-server enable [communities | mult-communities | notify]**

Enables SNMP-related functionality.  
 The no form of the command disables the SNMP server.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                            | Enables SNMP-related functionality: <ul style="list-style-type: none"> <li>• SNMP engine</li> <li>• SNMP traps</li> </ul> |
|                           | communities                                                                                                                                                                                                                                                                                                                                                                                                       | Enables community-based authentication on this system.                                                                    |
|                           | mult-communities                                                                                                                                                                                                                                                                                                                                                                                                  | Enables multiple communities to be configured.                                                                            |
|                           | notify                                                                                                                                                                                                                                                                                                                                                                                                            | Enables sending of SNMP traps and informs from this system.                                                               |
| <b>Default</b>            | SNMP is enabled by default<br>SNMP server communities are enabled by default<br>SNMP notifies are enabled by default<br>SNMP server multi-communities are disabled by default                                                                                                                                                                                                                                     |                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                          | First version                                                                                                             |
|                           | 3.2.1050                                                                                                                                                                                                                                                                                                                                                                                                          | Change traps to notify                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # snmp-server enable switch (config) # show snmp SNMP enabled:      yes SNMP port:         161 System contact:    my-name System location: Read-only community: public Read-write community: private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:      yes Default trap community: public Default trap port:  162  No trap sinks configured. switch (config) #</pre> |                                                                                                                           |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                           |
| <b>Note</b>               | SNMP traps are only sent if there are trap sinks configured with the “snmp-server host...” command, and if these trap sinks are themselves enabled.                                                                                                                                                                                                                                                               |                                                                                                                           |

## snmp-server host

**snmp-server host** <IP address> {disable | {traps | informs} [<community> | <port> | version <snmp version>]}

**no snmp-server host** <IPv4 or IPv6 address> {disable | {traps| informs} [<community> | <port>]}

Configures hosts to which to send SNMP traps.  
The no form of the commands removes a host from which SNMP traps should be sent.

|                           |                                                                                                                   |                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | IP address                                                                                                        | IPv4 or IPv6 address.                                     |
|                           | disable                                                                                                           | Temporarily disables sending of traps to this host.       |
|                           | community                                                                                                         | Specifies trap community string.                          |
|                           | port                                                                                                              | Overrides default UDP port for this trap sink.            |
|                           | snmp version                                                                                                      | Specifies the SNMP version of traps to send to this host. |
| <b>Default</b>            | No hosts are configured<br>Default community is “public”<br>Default UDP port is 162<br>Default SNMP version is 2c |                                                           |
| <b>Configuration Mode</b> | Config                                                                                                            |                                                           |
| <b>History</b>            | 3.1.0000                                                                                                          | First version                                             |
|                           | 3.2.1050                                                                                                          | Add inform option                                         |
| <b>Role</b>               | admin                                                                                                             |                                                           |

**Example**

```
switch (config) # snmp-server host 10.10.10.10 traps version 1
switch (config) # show snmp
SNMP enabled: yes
SNMP port: 161
System contact:
System location:

Read-only communities:
 public

Read-write communities:
 (none)

Interface listen enabled: yes
No Listen Interfaces.

Traps enabled: yes
Default trap community: public
Default trap port: 162

Trap sinks:
 10.10.10.10
 Enabled: yes
 Type: traps version 1
 Port: 162 (default)
 Community: public (default)
switch (config) #
```

**Related Commands**

```
show snmp
snmp-server enable
```

**Note**

This setting is only meaningful if traps are enabled, though the list of hosts may still be edited if traps are disabled. Refer to “snmp-server enable” command.



## snmp-server listen

**snmp-server listen {enable | interface <ifName>}**  
**no snmp-server listen {enable | interface <ifName> }**

Configures SNMP server interface access restrictions.  
 The no form of the command disables the listen interface restricted list for SNMP server.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Enables SNMP interface restrictions on access to this system.                          |
|                           | ifName                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Adds an interface to the “listen” list for SNMP server. For example: “mgmt0”, “mgmt1”. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                        |
| <b>Example</b>            | <pre> switch (config) # snmp listen enable switch (config) # show snmp SNMP enabled:          yes SNMP port:             161 System contact: System location: Read-only community:   public Read-write community:  private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:          yes Default trap community: public Default trap port:      162  Trap sinks:   10.10.10.10     Enabled: yes     Type: traps version 1     Port: 3     Community: public (default) switch (config) #           </pre> |                                                                                        |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                        |
| <b>Note</b>               | If enabled, and if at least one of the interfaces listed is eligible to be a listen interface, then SNMP requests will only be accepted on those interfaces. Otherwise, SNMP requests are accepted on any interface.                                                                                                                                                                                                                                                                                                         |                                                                                        |

## snmp-server location

**snmp-server location** <system location>

**no snmp-server location**

Sets a value for the sysLocation variable in MIB-II.

The no form of the command clears the contents of the sysLocation variable.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Syntax Description</b> | system location                                                                                                                                                                                                                                                                                                                                                                                                                                            | String. |
| <b>Default</b>            | ""                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |
| <b>Example</b>            | <pre> switch (config) # snmp-server location lab switch (config) # show snmp SNMP enabled:          yes SNMP port:             161 System contact:        my-name System location:       lab Read-only community:   public Read-write community:  private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:          yes Default trap community: public Default trap port:      162  No trap sinks configured. switch (config) # </pre> |         |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |

## snmp-server notify

**snmp-server notify {community <community> | event <event name> | port <port> | send-test}**

**no snmp-server notify {community | event <event name> | port}**

Configures SNMP notifications (traps and informs).

The no form of the commands negate the SNMP notifications.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | community                                                                                                                                                                                                                                                                                                                                                                                                                          | Sets the default community for traps sent to hosts which do not have a custom community string set. |
|                           | event                                                                                                                                                                                                                                                                                                                                                                                                                              | Specifies which events will be sent as traps.                                                       |
|                           | port                                                                                                                                                                                                                                                                                                                                                                                                                               | Sets the default port to which traps are sent.                                                      |
|                           | send-test                                                                                                                                                                                                                                                                                                                                                                                                                          | Sends a test trap.                                                                                  |
| <b>Default</b>            | Community: public<br>All informs and traps are enabled<br>Port: 162                                                                                                                                                                                                                                                                                                                                                                |                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                           | First version                                                                                       |
|                           | 3.2.1050                                                                                                                                                                                                                                                                                                                                                                                                                           | Changed traps to notify                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # snmp-server community public switch (config) # show snmp SNMP enabled:      yes SNMP port:         1000 System contact:    my-name System location:   lab Read-only community: public Read-write community: private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:      yes Default trap community: public Default trap port:  162  No trap sinks configured. switch (config) #</pre> |                                                                                                     |
| <b>Related Commands</b>   | show snmp<br>show snmp events                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This setting is only meaningful if traps are enabled, though the list of hosts may still be edited if traps are disabled</li> <li>Refer to Mellanox MIB file for the list of supported traps</li> </ul>                                                                                                                                                                                     |                                                                                                     |

## snmp-server port

**snmp-server port <port>**

**no snmp-server port**

Sets the UDP listening port for the SNMP agent.

The no form of the command resets the parameter to its default value.

| Syntax Description | port                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UDP port. |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Default            | 161                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |
| Example            | <pre>switch (config) # snmp-server port 1000 switch (config) # show snmp SNMP enabled:          yes SNMP port:             1000 System contact:        my-name System location:       lab Read-only community:   public Read-write community:  private  Interface listen enabled: yes No Listen Interfaces.  Traps enabled:          yes Default trap community: public Default trap port:      162  No trap sinks configured. switch (config) #</pre> |           |
| Related Commands   | show snmp                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |

## snmp-server user

```
snmp-server user {admin | <username>} v3 {[encrypted] auth <hash-type>
<password> [priv <privacy-type> [<password>]] | capability <cap> | enable
<sets> | prompt auth <hash-type> [priv <privacy-type>] | require-privacy}
no snmp-server user {admin | <username> } v3 {[encrypted] auth <hash-type>
<password> [priv <privacy-type> [<password>]] | capability <cap> | enable
<sets> | prompt auth <hash-type> [priv <privacy-type>]}
```

Specifies an existing username, or a new one to be added.  
The no form of the command disables access via SNMP v3 for the specified user.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | v3                                                                                                                                                                                                                                                                                                                                                                                                      | Configures SNMP v3 users                                                                                                                    |
|                           | auth                                                                                                                                                                                                                                                                                                                                                                                                    | Configures SNMP v3 security parameters, specifying passwords in plaintext on the command line (note: passwords are always stored encrypted) |
|                           | capability                                                                                                                                                                                                                                                                                                                                                                                              | Sets capability level for SET requests                                                                                                      |
|                           | enable                                                                                                                                                                                                                                                                                                                                                                                                  | Enables SNMP v3 access for this user                                                                                                        |
|                           | encrypted                                                                                                                                                                                                                                                                                                                                                                                               | Configures SNMP v3 security parameters, specifying passwords in encrypted form                                                              |
|                           | prompt                                                                                                                                                                                                                                                                                                                                                                                                  | Configures SNMP v3 security parameters, specifying passwords securely in follow-up prompts, rather than on the command line                 |
|                           | require-privacy                                                                                                                                                                                                                                                                                                                                                                                         | Requires privacy (encryption) for requests from this user                                                                                   |
| <b>Default</b>            | No SNMP v3 users defined                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # snmp-server user admin v3 enable switch (config) # show snmp user User name: admin   Enabled overall:      yes   Authentication type:  sha   Privacy type:         aes-128   Authentication password: (NOT SET; user disabled)   Privacy password:     (NOT SET; user disabled)   SET access:     Enabled:            yes     Capability level:    admin switch (config) #</pre> |                                                                                                                                             |
| <b>Related Commands</b>   | show snmp user                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                             |

## interfaces ib internal notification

**interfaces ib internal notification [link-speed-mismatch | link-state-change]**  
**no interfaces ib internal notification [link-speed-mismatch | link-state-change]**

Enables notifications on internal links in SNMP.  
 The no form of the command disables notifications on internal links in SNMP.

|                           |                                                                                                                                                                                      |                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | link-speed-mismatch                                                                                                                                                                  | Enables notifications on internal links' speed mismatch in SNMP. |
|                           | link-state-change                                                                                                                                                                    | Enables notifications on internal links state change in SNMP.    |
| <b>Default</b>            | N/A                                                                                                                                                                                  |                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                               |                                                                  |
| <b>History</b>            | 3.3.4318                                                                                                                                                                             |                                                                  |
|                           | 3.3.4550                                                                                                                                                                             | Added note                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                |                                                                  |
| <b>Example</b>            | <pre>switch [master] (config) # interfaces ib internal notification switch [master] (config) #</pre>                                                                                 |                                                                  |
| <b>Related Commands</b>   | show interfaces ib internal notification                                                                                                                                             |                                                                  |
| <b>Note</b>               | The parameter "link-speed-mismatch" shows internal link entries in the ifVPITable.<br>The parameter "link-state-change" shows internal link entries in the ifTable and the ifXTable. |                                                                  |

## show snmp

**show snmp** [auto-refresh | engineID | events | host | user]

Displays SNMP-server configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                    |                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | auto-refresh                                                                                                                                                                                                                                                                                                                       | SNMP refreshed mechanism status. |
|                           | engineID                                                                                                                                                                                                                                                                                                                           | SNMP Engine ID.                  |
|                           | events                                                                                                                                                                                                                                                                                                                             | SNMP events.                     |
|                           | host                                                                                                                                                                                                                                                                                                                               | List of notification sinks.      |
|                           | user                                                                                                                                                                                                                                                                                                                               | SNMP users.                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                |                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                             |                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                           |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                              |                                  |
| <b>Example</b>            | <pre>switch (config) # show snmp user User name: Hendrix   Enabled overall:      yes   Authentication type:  sha   Privacy type:         des   Authentication password: (set)   Privacy password:     (set)   Require privacy: yes   SET access:     Enabled:            yes     Capability level:   admin switch (config) #</pre> |                                  |
| <b>Related Commands</b>   | show snmp                                                                                                                                                                                                                                                                                                                          |                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                    |                                  |

## show snmp auto-refresh

### show snmp auto-refresh

Displays SNMPD refresh mechanism status.

|                           |                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                             |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre> switch(config) # show snmp auto-refresh ===== SNMP auto refresh ===== Auto-refresh enabled:           yes Refresh interval (sec):        60  ===== Auto-Refreshed tables ===== entPhysicalTable ifTable ifXTable  switch(config) # </pre> |
| <b>Related Commands</b>   | snmp-server auto-refresh                                                                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                                 |



## show interfaces ib internal notification

### show interfaces ib internal notification

Displays information about internal links notification.

|                           |                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                    |
| <b>History</b>            | 3.3.4318                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # show interfaces ib internal notification ===== Internal links information ===== State change enabled      :   yes Speed mismatch enabled    :   yes  switch (config) #</pre> |
| <b>Related Commands</b>   | interfaces ib internal notification                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                     |

### 4.17.3.2 XML API

## xml-gw enable

**xml-gw enable**  
**no xml-gw enable**

Enables the XML gateway.  
The no form of the command disables the XML gateway.

|                           |                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                               |
| <b>Default</b>            | XML Gateway is enabled                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                          |
| <b>Role</b>               | admin                                                                                                             |
| <b>Example</b>            | switch (config) # xml-gw enable<br>switch (config) # show xml-gw<br>XML Gateway enabled: yes<br>switch (config) # |
| <b>Related Commands</b>   | show xml-gw                                                                                                       |
| <b>Note</b>               |                                                                                                                   |

## show xml-gw

### show xml-gw

Displays the XML gateway setting.

|                           |                                                                                |
|---------------------------|--------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                            |
| <b>Default</b>            | N/A                                                                            |
| <b>Configuration Mode</b> | Config                                                                         |
| <b>History</b>            | 3.1.0000                                                                       |
| <b>Role</b>               | admin                                                                          |
| <b>Example</b>            | switch (config) # show xml-gw<br>XML Gateway enabled: yes<br>switch (config) # |
| <b>Related Commands</b>   | xml-gw enable                                                                  |
| <b>Note</b>               |                                                                                |

## 4.18 Puppet Agent

Puppet is a software that allows network administrators to automate repetitive tasks. MLNX-OS includes a built-in agent for the open-source “Puppet” configuration change management system. The Puppet agent enables configuring Mellanox switches in accordance with the standard “puppet-netdev-stdlib” type library and with the “Mellanox-netdev-stdlib-mlnxos” and “Mellanox-netdev-ospf-stdlib” type libraries provided by Mellanox Technologies to the Puppet community.

For more information, please refer to the CLI commands, to the NetDev documentation at <https://github.com/puppetlabs/puppet-netdev-stdlib> and to Mellanox’s Puppet modules GitHub page at <https://github.com/Mellanox>.

### 4.18.1 Setting the Puppet Server

➤ *To set the puppet server:*

**Step 1.** Define the Puppet server (the name has to be a DNS and not IP). Run:

```
switch (config) # puppet-agent master-hostname <please_type_your_hostname_DNS_here>
switch (config) #
```

**Step 2.** Enable the Puppet agent. Run:

```
switch (config) # puppet-agent enable
switch (config) #
```

**Step 3.** (Optional) Verify there are no errors in the Puppet agent log. Run:

```
switch (config) # show puppet-agent log continuous
switch (config) #
```

### 4.18.2 Accepting the Switch Request



This is to be performed on the first run only.

➤ *To accept the switch’s request:*

Option 1 – using Puppet CLI commands:

**Step 1.** Ensure the certificate request. Run:

```
puppet cert list
"<switch>"
(F4:B4:20:3B:2B:11:76:37:14:34:D0:D1:03:ED:3D:B5)
```

**Step 2.** Sign the certificate request if the cert\_name parameter (e.g. switch1.domain) is in the list. Run:

```
puppet cert sign <full_domain_name>
```

**Step 3.** Verify the request is removed from the Puppet certification list. Run:

```
puppet cert list
```

Option 2 – accept certificate requests in the puppet server console:

**Step 1.** Go to the “nodes requests” page (the button is at the top right), and wait for a certificate request for the switch and then accept it.

**Figure 15: Accepting an Agent Request through the Console**

Pending node requests: 1

Accept All
Reject All
There are no accepted/rejected requests to clear

| Name                        | Fingerprint    | Action                                  |
|-----------------------------|----------------|-----------------------------------------|
| switch-632476.mtr.labs.mlnx | 29:9F:4B:1F... | <span>Accept</span> <span>Reject</span> |

### 4.18.3 Installing Modules on the Puppet Server

Mellanox uses netdev-stdlib types and provides a package of Mellanox providers for those types which have to be installed at the Puppet server prior to the first Puppet configuration run (before configuring resources on the Mellanox switch).

To install those modules, run the following commands in the Puppet server:

```
puppet module install netdevops-netdev_stdlib
puppet module install mellanox-netdev_ospf_stdlib
puppet module install mellanox-netdev_stdlib_mlnxos
```



In case of an already installed module, please use the command “puppet module upgrade <module\_name>” or “puppet module install <module\_name> - -force” instead of “puppet module install <module\_name>” to reinstall the modules.

For more information please refer to the Network Automation Tools document or Puppet category in the Mellanox community site at: <http://community.mellanox.com/community/support/solutions>.

### 4.18.4 Writing Configuration Classes

#### ➤ To write configuration classes:

##### Step 1. Assigning Configuration Classes to a Node

Configuration files can be written and changed in the puppet server machine in the directory “/etc/puppetlabs/puppet/manifests/” (or “/etc/puppet/manifests” in case of an open source puppet server).

The file “/etc/puppetlabs/puppet/manifests/site.pp” is the main file for Puppet-classes-to-nodes association. To associate a configuration to a Puppet agent node, just append association lines as below:

```
import "netdev_vlan_example"
import "netdev_l2_vlan_example"
import "netdev_lag_example"
node 'switch-6375dc.mtr.labs.mlnx'{

 netdev_device { $hostname: }

 include vlan_example # Asserts a class vlan_example in one of the files
 include l2_interface_example
```

```
include lag_example

}
```



If you have a puppet console, you may assign classes of configuration in the following way:

- Add the relevant classes (using the console add class button on the “nodes” page).
- Assign the classes to the relevant nodes/groups in the puppet server console (in the console node/group page -> edit -> Classes).

### Step 2. Update VLAN

Manifest example (located in “/etc/puppetlabs/puppet/manifests/netdev\_vlan\_example.pp”).

```
class vlan_example{

 $vlans = {
 'Vlan244' => {vlan_id => 244, ensure => present},
 'Vlan245' => {vlan_id => 245, ensure => present},
 }

 create_resources(netdev_vlan, $vlans)
}
```

### Step 3. Update Layer 2 Interface.

Manifest example (located in “/etc/puppetlabs/puppet/manifests/netdev\_l2\_interface\_example.pp”)

```
class vlans_ensure_example{

 $vlans = {
 'Vlan347' => {vlan_id => 347, ensure => present},
 'Vlan348' => {vlan_id => 348, ensure => present},
 'Vlan349' => {vlan_id => 349, ensure => present},
 }

 create_resources(netdev_vlan, $vlans)
}

class l2_interface_example{

 include vlans_ensure_example #class to Ensure VLANs before assigning

 $l2_interfaces = {
 'ethernet 1/3' => {ensure => absent, vlan_tagging => disable}, #default
 'ethernet 1/4' => {ensure => present, vlan_tagging => enable,
 tagged_vlans => [Vlan348,Vlan347], untagged_vlan => Vlan349} #hybrid
 }

 create_resources(netdev_l2_interface, $l2_interfaces)
}
```

**Step 4.** Update LAG.

Manifest example (located in “/etc/puppetlabs/puppet/manifests/netdev\_lag\_example.pp”)

```
class lag_example{

 $lags = {
 'port-channel 101' => {ensure => present,
 links => ['ethernet 1/12', 'ethernet 1/13'], lacp => active},
 'port-channel 102' => {ensure => present,
 links => ['ethernet 1/6', 'ethernet 1/5'], lacp => disabled},
 }

 create_resources(netdev_lag, $lags)
}
```



You may add classes to ensure that all assigned links are with the same layer 1 and layer 2 configurations (similarly to the way we did in update l2\_interface section with vlans\_ensure\_example class).

## 4.18.5 Supported Configuration Capabilities

### 4.18.5.1 Ethernet, Port-Channel, and InfiniBand Interface Capabilities

**Table 38 - Ethernet, Port-Channel, and InfiniBand Interface Capabilities**

| Field       | Description                                                            | Values                        | Example                            |
|-------------|------------------------------------------------------------------------|-------------------------------|------------------------------------|
| ensure      | Sets the given values or restores the interface to default             | absent, present               | ensure => present                  |
| speed       | Sets the speed of the interface.                                       | auto* 10m 100m 1g 10g 40g 56g | speed => 1g                        |
| admin       | Disables/enables interface admin state.                                | up, down                      | admin => up                        |
| mtu         | Configures the maximum transmission unit frame size for the interface. | Ethernet: 1518-9216           | mtu => 1520                        |
| description | Sets the Ethernet, LAG and InfiniBand description.                     | Text                          | description => “changed_by_puppet” |

### 4.18.5.2 VLAN Capabilities

**Table 39 - VLAN Capabilities**

| Field   | Description                                         | Values           | Example           |
|---------|-----------------------------------------------------|------------------|-------------------|
| ensure  | Creates or destroys the VLAN given as a resource ID | absent, present  | ensure => present |
| vlan_id | The VLAN ID                                         | 1-4094 (integer) | vlan_id => 245    |

### 4.18.5.3 Layer 2 Ethernet Interface Capabilities

**Table 40 - L2 Ethernet and Port-Channel Interface Capabilities**

| Field         | Description                                                         | Values          | Example                           |
|---------------|---------------------------------------------------------------------|-----------------|-----------------------------------|
| ensure        | Sets the given values or restores the Layer 2 interface to default. | absent, present | ensure => present                 |
| vlan_tagging  | VLAN tagging mode                                                   | enable,disable  | vlan_tagging => enable            |
| tagged_vlans  | List of tagged (trunked) VLANs                                      | 2-4994 (range)  | tagged_vlans => [Vlan348,Vlan347] |
| untagged_vlan | Untag (access) VLAN                                                 | <VLAN name>     | untagged_vlan => Vlan349          |

### 4.18.5.4 LAG (Port-Channel) Capabilities

**Table 41 - LAG Capabilities**

| Field  | Description                                                 | Values                | Example                                  |
|--------|-------------------------------------------------------------|-----------------------|------------------------------------------|
| ensure | creates or destroys the port-channel given as a resource ID | absent, present       | ensure => present                        |
| lacp   | The LACP mode of the LAG                                    | passive   active   on | lacp => on                               |
| links  | List of ports assigned to the LAG                           | List of link names    | links => ['ethernet 1/6','ethernet 1/5'] |

### 4.18.5.5 Layer 3 Interface Capabilities

**Table 42 - L3 Interface Capabilities**

| Field  | Description                                                          | Values          | Example           |
|--------|----------------------------------------------------------------------|-----------------|-------------------|
| ensure | Creates or destroys the interface VLAN specified in the resource ID. | present, absent | ensure => present |



**Table 42 - L3 Interface Capabilities**

| Field     | Description                                                                        | Values                                                                                                 | Example                    |
|-----------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------|
| ipaddress | Sets IP address on the Layer 3 interface (requires netmask).                       | A valid IP address                                                                                     | ipaddress => '192.168.4.2' |
| netmask   | Sets netmask for the IP address.                                                   | A valid netmask (of the form X.1X2.X3.X4), which creates a valid combination with the given IP address | netmask => '255.255.255.0' |
| method    | Configures the method of the L3 interface (currently supports only static method). | static                                                                                                 | method => static           |

#### 4.18.5.6 OSPF Interface Capabilities

**Table 43 - OSPF Interface Capabilities**

| Field   | Description                                                                                                 | Values                     | Example                  |
|---------|-------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|
| ensure  | Creates or destroys the OSPF interface of the associated interface of the VLAN specified in the resource ID | present, absent            | ensure => present        |
| area_id | The associated area ID                                                                                      | Integer representing an IP | area_id => '7200'        |
| Type    | The network type                                                                                            | broadcast, point_to_point  | type => 'point_to_point' |

#### 4.18.5.7 OSPF Area Capabilities

**Table 44 - OSPF Area Capabilities**

| Field          | Description                                                                 | Values             | Example                              |
|----------------|-----------------------------------------------------------------------------|--------------------|--------------------------------------|
| ensure         | Creates or destroys the OSPF area specified in the resource ID              | present, absent    | ensure => present                    |
| router_id      | The OSPF area associated router ID (currently supports only default router) | default            | router_id => 'default'               |
| ospf_area_mode | The OSPF area mode                                                          | normal, stub, nssa | ospf_area_mode => 'stub'             |
| subnets        | A list of associated subnets                                                | List of subnets    | ['192.168.4.0/24', '192.168.5.0/24'] |

#### 4.18.5.8 Router OSPF Capabilities

**Table 45 - Router OSPF Capabilities**

| Field  | Description                                                 | Values          | Example           |
|--------|-------------------------------------------------------------|-----------------|-------------------|
| ensure | Enables/disables the router ID specified in the resource ID | present, absent | ensure => present |

#### 4.18.5.9 Protocol LLDP, SNMP, IP Routing and Spanning Tree Capabilities

**Table 46 - Protocol Enable/Disable Capabilities**

| Field  | Description                                                | Values          | Example           |
|--------|------------------------------------------------------------|-----------------|-------------------|
| ensure | Enables/disables the protocol specified in the resource ID | present, absent | ensure => present |

#### 4.18.5.10 Fetched Image Capabilities

**Table 47 - Fetched Image Capabilities**

| Field        | Description                                                                                      | Values                            | Example             |
|--------------|--------------------------------------------------------------------------------------------------|-----------------------------------|---------------------|
| ensure       | Enables/disables the protocol specified in the resource ID                                       | present, absent                   | ensure => present   |
| protocol     | Specifies the protocol for fetch method                                                          | http, https, ftp, tftp, scp, sftp | protocol => scp     |
| host         | The host where the file-name located                                                             | DNS/IP                            | host => my_DNS      |
| user         | The username for fetching the image                                                              | Username                          | user => my_username |
| password     | The password for fetching the image                                                              | Password                          | password => my_pass |
| location     | The location of the file name in the host file system                                            | Directory full path               | location => '/tmp'  |
| force_delete | Remove all the images or only the ones which are not installed on any partition, before fetching | yes, no                           | force_delete => no  |

#### 4.18.5.11 Installed Image Capabilities

**Table 48 - Installed Image Capabilities**

| Field               | Description                                                                              | Values          | Example                    |
|---------------------|------------------------------------------------------------------------------------------|-----------------|----------------------------|
| ensure              | Specifies if the image version given in as resource ID is ensured to be installed or not | present, absent | ensure => present          |
| is_next_boot        | Ensures that the installed image is the next boot partition                              | yes, no         | is_next_boot => yes        |
| configuration_write | Writes configurations to database.                                                       | yes, no         | configuration_write => yes |
| force_reload        | Reload if image is in other partition.                                                   | yes, no         | force_reload => no         |

#### 4.18.6 Supported Resources for Each Type

**Table 49 - Fetched Image Capabilities**

| Resource Type     | Puppet Type Name      | Supported Resource IDs                             | Example                                                                                  |
|-------------------|-----------------------|----------------------------------------------------|------------------------------------------------------------------------------------------|
| Network device    | netdev_device         | \$hostname                                         | netdev_device { \$hostname: }                                                            |
| Layer 1 interface | netdev_interface      | 'ethernet <#ID>', 'port-channel <#id>', 'ib <#ID>' | netdev_interface{'ethernet 1/3': ensure => absent}                                       |
| Layer 2 interface | netdev_l2_interface   | 'ethernet <#ID>', 'port-channel <#id>'             | netdev_l2_interface{'ethernet 1/3': ensure => absent}                                    |
| VLAN              | netdev_vlan           | VLAN name string                                   | netdev_vlan {'Vlan244': vlan_id => 244, ensure => present }                              |
| LAG               | netdev_lag            | 'port-channel <#id>'                               | netdev_lag {'port-channel 101': ensure => present }                                      |
| Layer 3 interface | netdev_l3_interface   | 'vlan <#ID>'                                       | netdev_l3_interface { 'vlan 4': ipaddress => '192.168.4.2', netmask => '255.255.255.0' } |
| OSPF interface    | netdev_ospf_interface | 'vlan <#ID>'                                       | netdev_ospf_interface { 'vlan 4': ensure => present, area_id => '10' }                   |
| OSPF area         | netdev_ospf_area      | Valid area ID (representing an IP)                 | netdev_ospf_area { '10': ensure => present, ospf_area_mode => 'stub' }                   |

**Table 49 - Fetched Image Capabilities**

| Resource Type   | Puppet Type Name   | Supported Resource IDS                | Example                                                                   |
|-----------------|--------------------|---------------------------------------|---------------------------------------------------------------------------|
| OSPF router     | netdev_router_ospf | Currently only supports 'default'     | netdev_router_ospf { 'default': ensure => present }                       |
| Protocol        | mlnx_protocol      | ip_routing, lldp, snmp, spanning_tree | mlnx_protocol { 'ip_routing': ensure => present }                         |
| Fetched image   | mlnx_fetched_img   | The image file name                   | mlnx_fetched_image { 'image-PPC_M460EX-3.3.4300.img': ensure => present } |
| Installed image | mlnx_installed_img | The image version name                | mlnx_installed_img { '3.3.4300': ensure => present }                      |

### 4.18.7 Troubleshooting

This section presents common issues that may prevent the switch from connecting to the puppet server.

#### 4.18.7.1 Switch and Server Clocks are not Synchronized

This can be fixed by using NTP to synchronize the clocks at the switch (using the CLI command `ntp`) and at the server (e.g. using `ntpdate`).

#### 4.18.7.2 Outdated or Invalid SSL Certificates Either on the Switch or the Server

This can be fixed on the switch using the CLI command `puppet-agent clear-certificates` (requires `puppet-agent restart` to take effect).

On the server it can be fixed by running `puppet cert clean <switch_fqdn>` (FQDN is the Fully Qualified Domain Name which consists of a hostname and a domain suffix).

#### 4.18.7.3 Communications Issue

Make sure it is possible to ping the puppet server hostname from the switch (using the CLI command `ping`).

If the hostname is not reachable (e.g. no DNS server) it can be statically added to the switch local hosts lookup (using the CLI command `ip host`).

Make sure that port 8140 is open (using the command `tracpath {<hostname> | <ip>}/8140`).

## 4.18.8 Commands

### puppet-agent

#### puppet-agent

Enters puppet agent configuration mode.

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                              |
| <b>Default</b>            | None                                                             |
| <b>Configuration Mode</b> | Config                                                           |
| <b>History</b>            | 3.3.4200                                                         |
| <b>Role</b>               | admin                                                            |
| <b>Example</b>            | switch (config) # puppet-agent<br>switch (config puppet-agent) # |
| <b>Related Commands</b>   |                                                                  |
| <b>Note</b>               |                                                                  |

## master-hostname

**master-hostname** <hostname>

**no master-hostname**

Sets the puppet server hostname.

The no form of the command resets the parameter to its default.

|                           |                                                                                                                     |                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Syntax Description</b> | hostname                                                                                                            | Puppet server hostname. Free string may be entered. |
| <b>Default</b>            | puppet                                                                                                              |                                                     |
| <b>Configuration Mode</b> | Config Puppet                                                                                                       |                                                     |
| <b>History</b>            | 3.3.4200                                                                                                            |                                                     |
| <b>Role</b>               | admin                                                                                                               |                                                     |
| <b>Example</b>            | <pre>switch (config puppet-agent) # master-hostname my-puppet-server-host-name switch (config puppet-agent) #</pre> |                                                     |
| <b>Related Commands</b>   |                                                                                                                     |                                                     |
| <b>Note</b>               |                                                                                                                     |                                                     |

## enable

**enable**  
**no enable**

Enables the puppet server on the switch.  
The no form of the command disables the puppet server.

|                           |                                                                         |
|---------------------------|-------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                     |
| <b>Default</b>            | Disabled                                                                |
| <b>Configuration Mode</b> | Config Puppet                                                           |
| <b>History</b>            | 3.3.4200                                                                |
| <b>Role</b>               | admin                                                                   |
| <b>Example</b>            | switch (config puppet-agent) # enable<br>switch (config puppet-agent) # |
| <b>Related Commands</b>   |                                                                         |
| <b>Note</b>               |                                                                         |

## run-interval

### **run-interval <time>**

Configures the time interval in which the puppet agent reports to the puppet server.

|                           |                                                                                   |                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                              | Can be in seconds ("30" or "30s"), minutes ("30m"), hours ("6h"), days ("2d"), or years ("5y"). |
| <b>Default</b>            | 30m                                                                               |                                                                                                 |
| <b>Configuration Mode</b> | Config Puppet                                                                     |                                                                                                 |
| <b>History</b>            | 3.3.4302                                                                          |                                                                                                 |
| <b>Role</b>               | admin                                                                             |                                                                                                 |
| <b>Example</b>            | switch (config puppet-agent) # run-interval 40m<br>switch (config puppet-agent) # |                                                                                                 |
| <b>Related Commands</b>   | show puppet-agent                                                                 |                                                                                                 |
| <b>Note</b>               |                                                                                   |                                                                                                 |



## restart

### **puppet-agent restart**

Restarts the puppet agent.

|                           |                                                                          |
|---------------------------|--------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                      |
| <b>Default</b>            | N/A                                                                      |
| <b>Configuration Mode</b> | Config Puppet                                                            |
| <b>History</b>            | 3.3.4200                                                                 |
| <b>Role</b>               | admin                                                                    |
| <b>Example</b>            | switch (config puppet-agent) # restart<br>switch (config puppet-agent) # |
| <b>Related Commands</b>   |                                                                          |
| <b>Note</b>               |                                                                          |

## show puppet-agent

### show puppet-agent

Displays Puppet agent status and configuration.

|                           |                                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                     |
| <b>History</b>            | 3.3.4200                                                                                                                                                             |
|                           | 3.3.4302 Updated output with run interval                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config puppet-agent) # show puppet-agent Puppet agent is disabled Puppet master hostname: puppet Run interval: 40m switch (config puppet-agent) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                                                      |

## show puppet-agent log

**show puppet-agent log** [[not] [matching | continuous] <string> | files [[not] matching] <string>]

Displays the Puppet agent's log file.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | continuous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Puppet agent log messages as they arrive.                    |
|                           | files                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays archived Puppet agent log files.                    |
|                           | matching                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays Puppet agent log that match a given string.         |
|                           | not                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Displays Puppet agent log that do not meet a certain string. |
|                           | string                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Free string.                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                              |
| <b>History</b>            | 3.3.4200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                              |
| <b>Example</b>            | <pre>switch (config puppet-agent) # show puppet-agent log Mon Nov 04 11:52:42 +0000 2013 Puppet (notice): Starting Puppet client version 3.2.3 Mon Nov 04 11:52:44 +0000 2013 Puppet (warning): Unable to fetch my node definition, but the agent run will continue: Mon Nov 04 11:52:44 +0000 2013 Puppet (warning): Could not intern from pson: source '"#&lt;Puppet::Node:0x7f' not in PSON! Mon Nov 04 11:53:21 +0000 2013 /Netdev_vlan[Vlan104]/ensure (notice): created Mon Nov 04 11:53:22 +0000 2013 /Netdev_vlan[Vlan101]/ensure (notice): created Mon Nov 04 11:53:23 +0000 2013 /Netdev_vlan[Vlan102]/ensure (notice): created Mon Nov 04 11:53:24 +0000 2013 /Netdev_vlan[Vlan103]/ensure (notice): created Mon Nov 04 11:53:40 +0000 2013 /Netdev_l2_interface[ethernet 1/6]/untagged_vlan (notice): untagged_vlan changed 'default' to 'Vlan103' Mon Nov 04 11:53:43 +0000 2013 /Netdev_l2_interface[ethernet 1/7]/untagged_vlan (notice): untagged_vlan changed 'default' to 'Vlan103' Mon Nov 04 11:53:48 +0000 2013 /Netdev_vlan[Vlan100]/ensure (notice): created Mon Nov 04 11:53:48 +0000 2013 /Netdev_l2_interface[ethernet 1/5]/vlan_tagging (notice): vlan_tagging changed 'enable' to 'disable' Mon Nov 04 11:53:48 +0000 2013 /Netdev_l2_interface[ethernet 1/5]/tagged_vlans (notice): tagged_vlans changed '[' to 'Vlan100,Vlan101,Vlan102]' Mon Nov 04 11:53:51 +0000 2013 /Netdev_l2_interface[ethernet 1/1]/tagged_vlans (notice): tagged_vlans changed '[' to '[Vlan101,Vlan104]' Mon Nov 04 11:53:51 +0000 2013 /Netdev_l2_interface[ethernet 1/1]/untagged_vlan (notice): untagged_vlan changed 'default' to 'Vlan100' Mon Nov 04 11:53:54 +0000 2013 /Netdev_l2_interface[ethernet 1/3]/tagged_vlans (notice): tagged_vlans changed '[' to '[Vlan101,Vlan104]' Mon Nov 04 11:53:54 +0000 2013 /Netdev_l2_interface[ethernet 1/3]/untagged_vlan (notice): untagged_vlan changed 'default' to 'Vlan100' Mon Nov 04 11:53:58 +0000 2013 /Netdev_l2_interface[ethernet 1/4]/vlan_tagging (notice): vlan_tagging changed 'enable' to 'disable' Mon Nov 04 11:53:58 +0000 2013 /Netdev_l2_interface[ethernet 1/4]/tagged_vlans (notice): tagged_vlans changed '[' to 'Vlan100,Vlan101,Vlan102]' Mon Nov 04 11:54:03 +0000 2013 /Netdev_l2_interface[ethernet 1/2]/tagged_vlans (notice): tagged_vlans changed '[' to '[Vlan101,Vlan104]' Mon Nov 04 11:54:03 +0000 2013 /Netdev_l2_interface[ethernet 1/2]/untagged_vlan (notice): untagged_vlan changed 'default' to 'Vlan100' Mon Nov 04 11:54:06 +0000 2013 Puppet (notice): Finished catalog run in 47.90 seconds switch (config puppet-agent) #</pre> |                                                              |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              |

## 4.19 Virtual Machine

A virtual machine (VM) on a switch is added to allow additional OS to run on top of the switch. The VM OS can connect through mgmt0 interface to the switch system's management interface. In addition, the VM is also connected to the out-of-band network. This allows it to communicate through the network and to control the switch management software.

The number of VMs that may run on a system is user-configurable and also relies on resource availability.



The number of configurable VMs is limited to 4.

Each VM consumes the following resources:

- Memory
- Processing power which is not policed (the user may determine the core to be used)
- MACs which are required for each vNIC (user configurable)

### 4.19.1 Virtual Machine Configuration

➤ *To configure a VM:*



The example below installs Ubuntu 14 and defines 3GB storage with 512MB memory (default) using the first core of the switch system (default) through mgmt0 interface (default) with an auto-generated MAC (default).

**Step 1.** Enable the VM feature. Run:

```
switch (config) # virtual-machine enable
```

**Step 2.** Create a VM. Run:

```
switch (config) # virtual-machine host my-vm
switch (config virtual-machine host my-vm) #
```

**Step 3.** Define storage for the VM. Run:

```
switch (config virtual-machine host my-vm) # storage create disk size-max 3000
100.0% [#####]
Created empty virtual disk volume 'vdisk001.img' in pool 'default'
Device attached to drive number 1.
switch (config virtual-machine host my-vm) #
```

**Step 4.** Display the VM parameters (notice boldface). Run:

```
switch (config virtual-machine host my-vm) # show virtual-machine host my-vm
VM 'my-vm'
 Status: shut off Architecture: x86_64
 VCPU used: 0 sec Number of VCPUs: 1
 Boot order: hd, cdrom Memory size: 512 MB
 Consoles: text, graphics
 Storage:
 IDE bus, drive 1: default/vdisk001.img (3000 MB capacity)
 Interfaces:
 1: on bridge 'mgmt0' address unknown (MAC 52:54:00:2F:89:69)
```

```
switch (config virtual-machine host my-vm) # exit
switch (config) #
```

**Step 5.** Import the VM image. Run:

```
switch (config) # virtual-machine volume fetch url scp://root@<ip>/.../ubuntu-14.04-
server-amd64.iso
Password (if required): *****
100.0% [#####]
```

**Step 6.** Install the imported image. Run:

```
switch (config) # virtual-machine host my-vm
switch (config virtual-machine host my-vm) # install cdrom file ubuntu-14.04-server-
amd64.iso
```

**Step 7.** Switch to a different terminal, and run the following command to connect VNC viewer to the VM:

```
$ vncviewer -via admin@<switch IP> 127.0.0.1:0
...
Mellanox MLNX-OS Switch Management

Password: *****
```

Continue VM installation from the VNC prompt.



The switch prompt is unresponsive pending a successful VM installation. Successful VM installation is indicated by the reboot of the VM.



VM IP is determined by DHCP configuration according to the MAC address in [Step 4](#).

➤ **To verify VM configuration, run:**

```
switch (config virtual-machine host my-vm) # show virtual-machine host my-vm
VM 'my-vm'
 Status: running Architecture: x86_64
 VCPU used: 12 min 27.440 sec Number of VCPUs: 1
 Boot order: cdrom, hd Memory size: 512 MB
 Consoles: text, graphics
 Storage:
 IDE bus, drive 1: default/vdisk001.img (3000 MB capacity)
 IDE bus, drive 2: default/ubuntu-14.04-server-amd64.iso (564 MB capacity) READ-ONLY
 Interfaces:
 1: on bridge 'mgmt0' address unknown (MAC 52:54:00:2F:89:69)
```

➤ **To remove a storage assigned to a VM:**

**Step 1.** Remove the VM assigned the disk space. Run:

```
switch (config) # no virtual-machine host my-vm
```

**Step 2.** Remove the disk space assigned to that VM. Run:

```
switch (config) # no virtual-machine volume file mydisk.img
```

## 4.19.2 Commands

### 4.19.2.1 Config

#### virtual-machine enable

**virtual-machine enable**  
**no virtual-machine enable**

Enables VM feature on the switch.  
The no form of the command disables VM feature on the switch.

|                           |                                          |
|---------------------------|------------------------------------------|
| <b>Syntax Description</b> | N/A                                      |
| <b>Default</b>            | no virtual-machine enable                |
| <b>Configuration Mode</b> | Config                                   |
| <b>History</b>            | 3.4.0000                                 |
| <b>Role</b>               | admin                                    |
| <b>Example</b>            | switch (config) # virtual-machine enable |
| <b>Related Commands</b>   |                                          |
| <b>Note</b>               |                                          |

## virtual-machine host

**virtual-machine host <vm-name>**  
**no virtual-machine host <vm-name>**

Creates a VM, or enters its configuration context if it already exists.  
 The no form of the command removes the VM of the specified name.

|                           |                                                                                                    |                               |
|---------------------------|----------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | vm-name                                                                                            | Configures a name for the VM. |
| <b>Default</b>            | N/A                                                                                                |                               |
| <b>Configuration Mode</b> | Config                                                                                             |                               |
| <b>History</b>            | 3.4.0000                                                                                           |                               |
| <b>Role</b>               | admin                                                                                              |                               |
| <b>Example</b>            | <pre>switch (config)# virtual-machine host my-vm switch (config virtual-machine host my-vm)#</pre> |                               |
| <b>Related Commands</b>   |                                                                                                    |                               |
| <b>Note</b>               |                                                                                                    |                               |

## arch

**arch {i386 | x86\_64}**

Configures VM CPU architecture.

|                           |                                                       |                             |
|---------------------------|-------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | i386                                                  | 32-bit x86 CPU architecture |
|                           | x86_64                                                | 64-bit x86 CPU architecture |
| <b>Default</b>            | x86_64                                                |                             |
| <b>Configuration Mode</b> | Config Virtual Machine Host                           |                             |
| <b>History</b>            | 3.4.0000                                              |                             |
| <b>Role</b>               | admin                                                 |                             |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# arch i386 |                             |
| <b>Related Commands</b>   | virtual-machine                                       |                             |
| <b>Note</b>               |                                                       |                             |



## comment

**comment** <string>

**no comment**

Configures a comment describing the VM.

The no form of the command deletes the configured comment.

|                           |                                                                                     |             |
|---------------------------|-------------------------------------------------------------------------------------|-------------|
| <b>Syntax Description</b> | string                                                                              | Free string |
| <b>Default</b>            | N/A                                                                                 |             |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                                         |             |
| <b>History</b>            | 3.4.0000                                                                            |             |
| <b>Role</b>               | admin                                                                               |             |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# comment "example VM"                    |             |
| <b>Related Commands</b>   | virtual-machine                                                                     |             |
| <b>Note</b>               | To configure a multi-word string, the string must be placed within quotation marks. |             |

## console

**console {connect [graphics | text [force]] | graphics vnc | text tty}**  
**no console {graphics vnc | text tty}**

Configures or connects to a text or graphical console.  
 The no form of the command clears console settings.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | connect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Connects to the text console unless specified otherwise: <ul style="list-style-type: none"> <li>graphics – connects to the X11 graphical (VNC) console</li> <li>text – connects to the text console</li> </ul> |
|                           | graphics vnc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Enables graphical (VNC) console access                                                                                                                                                                         |
|                           | text tty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Enables TTY text console access                                                                                                                                                                                |
| <b>Default</b>            | Graphical and textual consoles are enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# console connect text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                |
| <b>Related Commands</b>   | virtual-machine<br>ssh server x11-forwarding enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>To exit the text console press Ctrl-6 (or Ctrl-Shift-6)</li> <li>If the guest OS is not configured to receive input from a serial console (ttyS0), the VM console becomes unresponsive when connected to.</li> <li>To view the graphical console, X display must be enabled. There are two options to activate it, the command <code>vncviewer -via admin@&lt;switchIP&gt; 127.0.0.1:&lt;VNC display num&gt;</code> (which is run from an external Linux host) and the command <code>ssh server x11-forwarding enable</code> (which is run from within the switch and requires that you log out and log back in again using <code>ssh -X</code>). The latter command weakens the switch security, therefore, it is recommended to opt for the second option. The VNC display num parameter may be procured by running the command <code>show virtual-machine &lt;vm-name&gt; detail</code>.</li> </ul> |                                                                                                                                                                                                                |

## install

**install {cancel | cdrom [pool <pool-name>] {file <volume-name> [connect-console <console-type> | disk-overwrite | timeout {<minutes> | none}]}}**

Installs an operating system onto this VM (temporarily attach a CD and boot from it).

|                           |                                                                                                     |                                                                                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | cancel                                                                                              | Cancels an install already in progress                                                                                                                                         |
|                           | cdrom                                                                                               | Installs an operating system from a CD-ROM (ISO) image                                                                                                                         |
|                           | pool <pool-name>                                                                                    | Configures storage pool in which to find image to install: <ul style="list-style-type: none"> <li>• default</li> <li>• usb</li> </ul>                                          |
|                           | file <volume-name>                                                                                  | Specifies CD-ROM (ISO) image from which to install                                                                                                                             |
|                           | connect-console <console-type>                                                                      | Connects to the console during installation. The types may be: <ul style="list-style-type: none"> <li>• text – text console</li> <li>• graphics – graphical console</li> </ul> |
|                           | disk-overwrite                                                                                      | Installs even if primary target volume is not empty                                                                                                                            |
|                           | timeout {<minutes>   none}                                                                          | Configures a timeout for installation in minutes (default is no timeout).                                                                                                      |
| <b>Default</b>            | N/A                                                                                                 |                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                                                         |                                                                                                                                                                                |
| <b>History</b>            | 3.4.0000                                                                                            |                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                               |                                                                                                                                                                                |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# install cdrom pool usb file <image>                     |                                                                                                                                                                                |
| <b>Related Commands</b>   | virtual-machine                                                                                     |                                                                                                                                                                                |
| <b>Note</b>               | The default pool from which the system installs the ISO image is the /var/ partition in the switch. |                                                                                                                                                                                |

## interface

**interface** <id> {**bridge** <bridge> | **macaddr** <mac> | **model** <model> | **name** <name>}

Configures virtual interfaces.

|                           |                                                                      |                                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <id>                                                                 | Interface ID number (1-8 permitted)                                                                                                                          |
|                           | bridge <bridge>                                                      | Configures bridge for this interface (i.e. mgmt0 or mgmt1)                                                                                                   |
|                           | macaddr <mac>                                                        | Configures MAC address (e.g. ff:ee:dd:cc:bb:aa)                                                                                                              |
|                           | model <model>                                                        | Configures virtual interface model: <ul style="list-style-type: none"> <li>• realtek-8139 – Realtek 8139 (default)</li> <li>• virtio – Virtual IO</li> </ul> |
|                           | name <name>                                                          | Configures virtual interface name. The name must begin with “vif”.                                                                                           |
| <b>Default</b>            | N/A                                                                  |                                                                                                                                                              |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                          |                                                                                                                                                              |
| <b>History</b>            | 3.4.0000                                                             |                                                                                                                                                              |
| <b>Role</b>               | admin                                                                |                                                                                                                                                              |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# interface 1 model virtio |                                                                                                                                                              |
| <b>Related Commands</b>   | virtual-machine                                                      |                                                                                                                                                              |
| <b>Note</b>               |                                                                      |                                                                                                                                                              |

## memory

### memory <MB>

Configures memory allowance.

|                           |                                                                   |                    |
|---------------------------|-------------------------------------------------------------------|--------------------|
| <b>Syntax Description</b> | MB                                                                | Size in megabytes. |
| <b>Default</b>            | 512MB                                                             |                    |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                       |                    |
| <b>History</b>            | 3.4.0000                                                          |                    |
| <b>Role</b>               | admin                                                             |                    |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# memory 1024           |                    |
| <b>Related Commands</b>   | virtual-machine                                                   |                    |
| <b>Note</b>               | It is recommended not to allocate more than 1GB of memory per VM. |                    |

## power

**power {cycle [force | connect-console {graphics | text}] | off [force] | on [connect-console {graphics | text}]}**

Turns the VM on or off, or other related options.

|                           |                                                               |                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | cycle                                                         | Powers the VM down and then on again immediately                                                                                                                          |
|                           | force                                                         | Forces an action on the system.                                                                                                                                           |
|                           | connect-console <console-type>                                | Connects to the console after power-on. The types may be: <ul style="list-style-type: none"> <li>• text – text console</li> <li>• graphics – graphical console</li> </ul> |
|                           | off                                                           | Powers down the VM                                                                                                                                                        |
|                           | on                                                            | Powers on VM:                                                                                                                                                             |
|                           |                                                               |                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                           |                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                   |                                                                                                                                                                           |
| <b>History</b>            | 3.4.0000                                                      |                                                                                                                                                                           |
| <b>Role</b>               | admin                                                         |                                                                                                                                                                           |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# power cycle force |                                                                                                                                                                           |
| <b>Related Commands</b>   | virtual-machine                                               |                                                                                                                                                                           |
| <b>Note</b>               |                                                               |                                                                                                                                                                           |

## storage create

**storage create disk** [**drive-number** <number> | **file** <filename> | **mode** {read-only | read-write} | **pool** <pool-name> | **size-max** <MB>]

Creates a new storage device for the VM, with an automatically assigned name.

|                           |                                                                               |                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | create disk                                                                   | Creates a new virtual disk image for this VM.                                                                     |
|                           | drive-number <number>                                                         | Specifies the drive number to be assigned to the volume. Insert “new” to assign a new drive number to the volume. |
|                           | file <filename>                                                               | Specifies filename for new volume to be created                                                                   |
|                           | mode {read-only   read-write}                                                 | Specifies initial device mode                                                                                     |
|                           | pool <pool-name>                                                              | Specifies storage pool in which to create new volume                                                              |
|                           | size-max <MB>                                                                 | Specifies maximum disk capacity in megabytes                                                                      |
| <b>Default</b>            | N/A                                                                           |                                                                                                                   |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                                   |                                                                                                                   |
| <b>History</b>            | 3.4.0000                                                                      |                                                                                                                   |
| <b>Role</b>               | admin                                                                         |                                                                                                                   |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# storage create disk size-max 2000 |                                                                                                                   |
| <b>Related Commands</b>   | virtual-machine                                                               |                                                                                                                   |
| <b>Note</b>               |                                                                               |                                                                                                                   |

## storage device

**storage device** [bus ide] drive-number <number> [mode {read-only | read-write}] source {[pool <pool-name>] file <filename>}  
**no storage device** [bus ide] drive-number <id>

Modifies existing storage device, or create a new one with a specific name.  
 The no form of the command removes a storage device from the VM.

|                           |                                                                         |                                                                                                                                                                                                            |
|---------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | device                                                                  | Modifies existing storage device, or creates a new one with a specific name                                                                                                                                |
|                           | bus ide                                                                 | Configures bus type to IDE                                                                                                                                                                                 |
|                           | drive-number <number>                                                   | Selects device to configure by drive number                                                                                                                                                                |
|                           | mode {read-only   read-write}                                           | Configures the device mode: <ul style="list-style-type: none"> <li>• read-only – sets the read-only attribute of the volume</li> <li>• read-write – sets the read-write attribute of the volume</li> </ul> |
|                           | source                                                                  | Specifies where the data for this volume resides                                                                                                                                                           |
|                           | file <filename>                                                         | Specifies the filename for this volume                                                                                                                                                                     |
|                           | pool <pool-name> file <filename>                                        | Specifies the storage pool for this volume                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                     |                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                             |                                                                                                                                                                                                            |
| <b>History</b>            | 3.4.0000                                                                |                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                   |                                                                                                                                                                                                            |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# storage create disk bus ide |                                                                                                                                                                                                            |
| <b>Related Commands</b>   | virtual-machine                                                         |                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                         |                                                                                                                                                                                                            |



## vcpus

**vcpus {count <count> | vcpu <vcpu> pin <cpu-list> [<cpu-list>]}**  
**no vcpus {pin | vcpu <vcpu> pin}**

Specifies virtual CPUs.

The no form of the command removes certain CPU configuration.

|                           |                                                           |                                                |
|---------------------------|-----------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | count <count>                                             | Specifies the number of virtual CPUs           |
|                           | vcpu <vcpu>                                               | Specifies options for a particular virtual CPU |
|                           | pin <cpu-list>                                            | Specifies physical CPUs to pin to this vCPU    |
| <b>Default</b>            | N/A                                                       |                                                |
| <b>Configuration Mode</b> | Config Virtual Machine Host                               |                                                |
| <b>History</b>            | 3.4.0000                                                  |                                                |
| <b>Role</b>               | admin                                                     |                                                |
| <b>Example</b>            | switch (config virtual-machine host my-vm)# vcpus count 1 |                                                |
| <b>Related Commands</b>   |                                                           |                                                |
| <b>Note</b>               |                                                           |                                                |

## virtual-machine volume fetch url

**virt volume fetch url** <download-url> [filename <filename> | pool <pool-name> filename <filename>]

Fetches volume image from a remote host.

|                           |                                                                                                  |                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | download-url                                                                                     | Specifies URL from which to fetch a volume. Format: http, https, ftp, tftp, scp and sftp are supported (e.g. scp://username[:password]@hostname/path/filename) |
|                           | filename <filename>                                                                              | Specifies new filename for fetched volume image                                                                                                                |
|                           | pool-name <pool-name>                                                                            | Specifies storage pool for fetched volume image                                                                                                                |
| <b>Default</b>            | N/A                                                                                              |                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                                                      |                                                                                                                                                                |
| <b>History</b>            | 3.4.0000                                                                                         |                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                            |                                                                                                                                                                |
| <b>Example</b>            | switch (config) # virtual-machine volume fetch scp://admin[:admin-pass]@<hostname/path/filename> |                                                                                                                                                                |
| <b>Related Commands</b>   |                                                                                                  |                                                                                                                                                                |
| <b>Note</b>               |                                                                                                  |                                                                                                                                                                |

## virt volume file

**virt volume file <name> {create disk size-max <MB> | move {new-name <new-name> | pool <pool-name> new-name <new-name>} | upload <upload-url>}  
no virt volume file <volume-name>**

Specifies name of volume file to manage.  
The no form of the command deletes the volume file.

|                           |                                                                           |                                                                                                                                                  |
|---------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | file <name>                                                               | Specifies name of volume file to manage                                                                                                          |
|                           | create                                                                    | Creates a new volume file under this name                                                                                                        |
|                           | disk size-max <MB>                                                        | Specifies maximum capacity of virtual disk to create                                                                                             |
|                           | move                                                                      | Moves or renames this volume                                                                                                                     |
|                           | new-name <filename>                                                       | Specifies a name for the destination file                                                                                                        |
|                           | pool <pool-name> new-name <filename>                                      | Specifies a storage pool for the copy                                                                                                            |
|                           | upload <upload-url>                                                       | Uploads this volume file to a remote host. Format: ftp, tftp, scp and sftp are supported (e.g. scp://username[:password]@hostname/path/filename) |
| <b>Default</b>            | N/A                                                                       |                                                                                                                                                  |
| <b>Configuration Mode</b> | Config Virtual Machine Host                                               |                                                                                                                                                  |
| <b>History</b>            | 3.4.0000                                                                  |                                                                                                                                                  |
| <b>Role</b>               | admin                                                                     |                                                                                                                                                  |
| <b>Example</b>            | switch (config) # virt volume file my-vm_file create cdrom extract cdrom1 |                                                                                                                                                  |
| <b>Related Commands</b>   |                                                                           |                                                                                                                                                  |
| <b>Note</b>               |                                                                           |                                                                                                                                                  |

## 4.19.2.2 Show

### show virtual-machine configured

#### show virtual-machine configured

Displays global virtualization configuration.

|                           |                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                               |
| <b>Default</b>            | N/A                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                  |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # show virtual-machine configured Virtualization enabled:      yes Virtual machines:           2 configured Virtual networks:           0 configured switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                   |

## show virtual-machine host

**show virtual-machine host [<vm-name>]**

Displays status for this VM.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | vm-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The name of the VM. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| <b>Example</b>            | <pre>switch (config) # show virtual-machine host my-vm VM 'my-vm'   Status:          shut off                Architecture:    x86_64   VCPU used:       0 sec                    Number of VCPUs: 1   Boot order:      hd, cdrom                Memory size:     512 MB   Consoles:        text, graphics   Storage:     IDE bus, drive 1: default/vdisk001.img (3000 MB capacity)   Interfaces:     1: on bridge 'mgmt0'                    address unknown (MAC 52:54:00:2F:89:69) switch (config) #</pre> |                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| <b>Note</b>               | <p>If the command is run in the middle of an installation, the following banner appears:</p> <pre>*** INSTALL IN PROGRESS: begun &lt;time&gt; ago ***</pre>                                                                                                                                                                                                                                                                                                                                                  |                     |

## show virtual-machine host configured

**show virtual-machine host <vm-name> configured [detail]**

Displays configuration for this VM.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Syntax Description</b> | vm-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The name of the VM.                          |
|                           | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Displays detailed configuration for this VM. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |
| <b>Example</b>            | <pre>switch (config) # show virtual-machine host my-vm configured detail VM 'my-vm'   UUID:                0a177a99-f780-5951-877a-bd660e12e5db   Text console:        enabled   Graphics console:    enabled    Auto-power:          last   Boot order:          hd, cdrom   Architecture:        x86_64   Memory size:         512 MB   Features:            ACPI, APIC   Number of VCPUs:     1                       (No VCPUs pinned)    Storage:     IDE bus, drive 1       Source pool:      default       Source file:      vdisk001.img (3000 MB capacity)       Mode:             read-write    Interfaces:     Interface 1       Name:             vif1       MAC address:      52:54:00:2F:89:69       Model:            realtek-8139       Bound to:         bridge 'mgmt0' switch (config) #</pre> |                                              |

### Related Commands

### Note

## show virtual-machine host detail

### show virtual-machine host <vm-name> detail

Displays detailed status for this VM.

| Syntax Description | vm-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The name of the VM. |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| History            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Example            | <pre>switch (config) # show virtual-machine host my-vm detail VM 'my-vm'   Status:                shut off   UUID:                  0a177a99-f780-5951-877a-bd660e12e5db   Text console:          enabled     Device:              N/A   Graphics console:      enabled     VNC display num:     N/A    Boot order:            hd, cdrom   Architecture:          x86_64   Memory size:           512 MB   Features:              ACPI, APIC   Number of VCPUs:       1     (State of individual VCPUs unavailable when VM is powered off)    Storage:     IDE bus, drive 1       Source pool:        default       Source file:        vdisk001.img (3000 MB capacity)       Mode:               read-write       Device type:        disk       Read requests:      N/A       Read bytes:         N/A       Write requests:     N/A       Write bytes:        N/A    Interfaces:     Interface 1       Name:               vif1       MAC address:        52:54:00:2F:89:69       Model:              realtek-8139       Bound to:           bridge 'mgmt0'       IP address:        RX bytes:           0       RX packets:         0       RX errors:          0       RX drop:            0       TX bytes:           0       TX packets:         0       TX errors:          0       TX drop:            0 switch (config) #</pre> |                     |

**Related Commands**

**Note**



## show virtual-machine install

**show virtual-machine host <vm-name> install**

Displays status of installation of guest OS.

|                           |                                                                                                                                                                                                                              |                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | vm-name                                                                                                                                                                                                                      | The name of the VM. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                          |                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                             |                     |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                     |                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                        |                     |
| <b>Example</b>            | <pre>switch (config) # show virtual-machine host my-vm install Install status for VM 'my-vm'     Install in progress, begun 2 minutes 28 seconds ago.     No previous install information available. switch (config) #</pre> |                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                              |                     |
| <b>Note</b>               |                                                                                                                                                                                                                              |                     |

## show virtual-machine interface

**show virtual-machine host <vm-name> interface [brief | configure]**

Displays full status of all interfaces for this VM.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | vm-name                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The name of the VM.                                   |
|                           | brief                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Displays brief status of all interfaces for this VM.  |
|                           | configure                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays configuration of all interfaces for this VM. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                       |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                       |
| <b>Example</b>            | <pre>switch (config) # show virtual-machine host my-vm interface Interface 1   Name:          vif1   MAC address:   52:54:00:2F:89:69   Model:         realtek-8139   Bound to:      bridge 'mgmt0'   IP address:    RX bytes:      0                TX bytes:      0   RX packets:    0                TX packets:    0   RX errors:      0                TX errors:      0   RX drop:        0                TX drop:        0 switch (config) #</pre> |                                                       |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |

## show virtual-machine storage

**show virtual-machine host <vm-name> storage**

Displays statistics for attached storage.

|                           |                                                                                                                                                                                                                                                                                                                                                                                          |                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | vm-name                                                                                                                                                                                                                                                                                                                                                                                  | The name of the VM. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                         |                     |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| <b>Example</b>            | <pre>switch (config) # show virtual-machine host my-vm storage Storage for VM 'my-vm'   IDE bus, drive 1     Source pool:      default     Source file:      vdisk001.img (3000 MB capacity)     Mode:             read-write     Device type:      disk     Read requests:    N/A     Read bytes:       N/A     Write requests:   N/A     Write bytes:      N/A switch (config) #</pre> |                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                          |                     |

## 4.20 Back-Up Battery Units

The back-up battery unit (BBUs) is an optional field replaceable unit installed inside the power supply unit (PSU) which provides power to the platform. The BBU is a hardware feature which provides energy in case the main and, if equipped, the back-up PSUs fail.

The BBU provides power outage for a limited time which allows time for performing controlled shutdown or recovering the main power source of the system, or connecting to a new power source.

When the switch system is plugged in to a power source, the BBU may be configured to charge in preparation for possible power outage scenarios.



Switching from the main power source to the BBU and vice versa does not interfere with the normal operation of the switch system.

The only switch system featuring BBUs is SX6720.

## 4.20.1 Commands

### battery-backup-unit charge

**battery-backup-unit charge {bbu1 | bbu2 | all}**  
**no battery-backup-unit charge {bbu1 | bbu2 | all}**

Enables charging the BBU.  
 The no form of the command disables charging the BBU.

|                           |                                                                                                                                                                                                                                                                             |                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | bbu1                                                                                                                                                                                                                                                                        | Enables charging of BBU1      |
|                           | bbu2                                                                                                                                                                                                                                                                        | Enables charging of BBU2      |
|                           | all                                                                                                                                                                                                                                                                         | Enables charging of both BBUs |
| <b>Default</b>            | Enabled                                                                                                                                                                                                                                                                     |                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                            |                               |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                    | First version                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                       |                               |
| <b>Example</b>            | switch (config) # battery-backup-unit charge all                                                                                                                                                                                                                            |                               |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                         |                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When disabled, the BBU protection against power outage is still available, however the BBU will not be charged</li> <li>For example, this command can be used when there is a need to lower the chassis power consumption</li> </ul> |                               |

## battery-backup-unit discharge

**battery-backup-unit discharge {bbu1 | bbu2 | all}**  
**no battery-backup-unit discharge {bbu1 | bbu2 | all}**

Enables discharging the BBU in case of power outage.  
 The no form of the command disables discharging the BBU in case of power outage.

|                           |                                                                                  |                               |
|---------------------------|----------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | bbu1                                                                             | Enables charging of BBU1      |
|                           | bbu2                                                                             | Enables charging of BBU2      |
|                           | all                                                                              | Enables charging of both BBUs |
| <b>Default</b>            | Enabled                                                                          |                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                 |                               |
| <b>History</b>            | 3.4.1100                                                                         | First version                 |
| <b>Role</b>               | admin                                                                            |                               |
| <b>Example</b>            | switch (config) # battery-backup-unit discharge all                              |                               |
| <b>Related Commands</b>   | N/A                                                                              |                               |
| <b>Note</b>               | Warning: When disabled, the BBU will not provide protection against power outage |                               |

## show battery-backup-unit

### show battery-backup-unit

Displays the present BBU devices.

| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------|-----------|-------|--------|----------------|--------|-----------|------|------------|--------------------------------|--------|--------|------|------------|---------------|--------|---------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| History            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | First version                  |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| Example            | <pre>switch (config) # show battery-backup-unit</pre> <div><div>-----</div><table><tr><th>Modul</th><th>Device</th><th>Charging state</th><th>charge</th><th>discharge</th></tr><tr><td>BBU1</td><td>controller</td><td>Charging 58%, remaining 1:20 H</td><td>enable</td><td>enable</td></tr><tr><td>BBU2</td><td>controller</td><td>Fully charged</td><td>enable</td><td>disable</td></tr></table><div>-----</div></div> <p>Estimated battery run-time: 8:00 minutes</p> <pre>switch (config) #</pre> |                                |        |           | Modul | Device | Charging state | charge | discharge | BBU1 | controller | Charging 58%, remaining 1:20 H | enable | enable | BBU2 | controller | Fully charged | enable | disable |
| Modul              | Device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Charging state                 | charge | discharge |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| BBU1               | controller                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Charging 58%, remaining 1:20 H | enable | enable    |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| BBU2               | controller                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Fully charged                  | enable | disable   |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| Related Commands   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                |        |           |       |        |                |        |           |      |            |                                |        |        |      |            |               |        |         |

## show battery-backup-unit details

**show battery-backup-unit {bbu1 | bbu2 | all} details**

Displays the present BBU devices.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | bbu1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Enables charging of BBU1      |
|                           | bbu2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Enables charging of BBU2      |
|                           | all                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Enables charging of both BBUs |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | First version                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |
| <b>Example</b>            | <pre>switch (config) # show battery-backup-unit bbu1 details battery backup unit [bbu1] details   Charging state      : Charge disabled, Fully charged   Last test result   : N/A   Charge rate        : fast   Alarms              : none   Relative capacity   : 74320 mWh / 99%   Absolute capacity   : 75820 mWh   Designed capacity   : 88560 mWh   Manufacturer name   : ACBEL   Manufacture date    : 14-39   Serial number       : 000259   Chemistry           : Li-Ion   Temperature         : 22.90 C   Voltage             : 12.500 V   Current             : 3960 mA   Absolute charge     : 84%   Manufacturer data   :</pre> |                               |
|                           | switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                               |



## 5 Ethernet Switching

### 5.1 Interface

Interface Ethernet have the following physical set of configurable parameters

- Admin state – enabling or disabling the interface
- Flow control – admin state per direction (send or receive)
- MTU (Maximum Transmission Unit) – 1500-9216 bytes
- Speed – 1/10/40/56GbE (depends on the interface type and system)
- Description – user defined string
- Module-type – the type of the module plugged in the interface

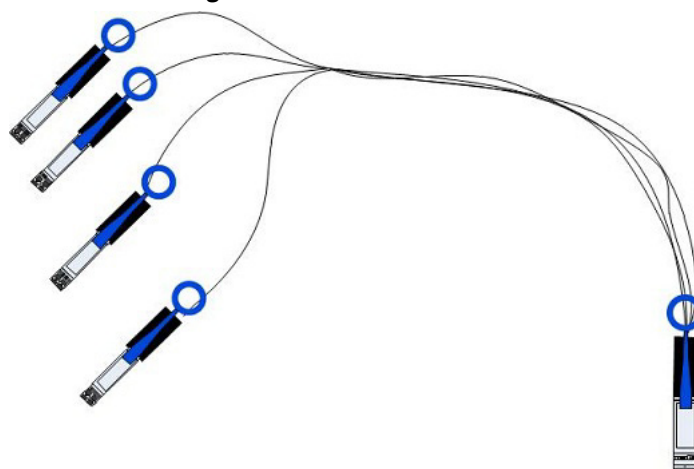


To use 40GbE QSFP interfaces as 10GbE (via QSA adapter), the speed must be manually set with the command “speed 10000” under the interface configuration mode.

#### 5.1.1 Break-Out Cables

The break-out cable is a unique Mellanox capability, where a single physical 40Gbps port is divided into 2x10Gbps or 4x10Gbps ports. It maximizes the flexibility of the end user to use the Mellanox switch with a combination of 10Gbps and 40Gbps interfaces according to the specific requirements of its network. Certain ports cannot be split at all and there are ports which can be split into 2 ports only. Splitting a port changes the notation of that port from x/y to x/y/z with “x/y” indicating the previous notation of the port prior to the split and “z” indicating the number of the resulting 10G port (1,2 or 1,2,3,4). Each sub-physical port is then handled as an individual port. For example: splitting port 10 into 4 will give the following new ports: 1/10/1, 1/10/2, 1/10/3, 1/10/4.

**Figure 16: Break-Out Cable**



A split-4 operation results in blocking a 40G port in addition to the one being split. A set of hardware restrictions determine which of the ports can be split.

Specific ports can be split by using a QSFP 1X4 breakout cable to split one 40 Gb/s port into 4 lanes (4 SFP+ connectors). These 4 lanes then go, one lane to each of the 4 SFP+ connectors. Some ports can be split into 2 10 Gb/s ports, using lanes 1 and 2 only. When a QSFP port is split into 2 10Gb/s ports then only SFP+ connectors #1 and #2 are used. Connectors #3 and #4 are left unconnected.

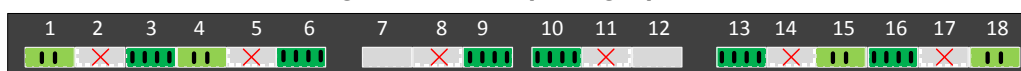


Splitting the interface deletes all configuration on that interface.

When splitting an interface's traffic into 4 10Gb/s data streams (four lanes) one of the other ports on the switch must be disabled (unmapped).

- some ports can be split into 4
- some ports can be split into 2
- some ports become unmapped due to a 1X4 split

**Figure 17: Port Splitting Options**



This port can be split into 4 10Gb/s SFP+

This port can be split into 2 10Gb/s SFP+

This port is unmapped by the neighboring split 4 port

The maximum number of 10 Gb/s Ethernet ports configurable with this switch is 34.

**Table 50 - Port Splitting Options**

| Port # | Can be split to 4 | Turns off port # | Can be split to 2 | Port # | Can be split to 4 | Turns off port # | Can be split to 2 |
|--------|-------------------|------------------|-------------------|--------|-------------------|------------------|-------------------|
|        | —                 |                  | YES               |        | YES               |                  | —                 |
|        | —                 |                  | —                 |        | —                 |                  | —                 |
|        | YES               |                  | —                 |        | —                 |                  | —                 |
|        | —                 |                  | YES               |        | YES               |                  | —                 |
|        | —                 |                  | —                 |        |                   |                  | —                 |
|        | YES               |                  | —                 |        |                   |                  | YES               |
|        | —                 |                  | —                 |        | YES               |                  | —                 |
|        | —                 |                  | —                 |        | —                 |                  | —                 |
|        | YES               |                  | —                 |        | —                 |                  | YES               |

To see the exact splitting options available per system, refer to each specific system's hardware user manual (Cabling chapter) located on the Mellanox website.

### 5.1.1.1 Changing the Module Type to a Split Mode

➤ *To split an interface:*

**Step 1.** Shut down all the ports related to the interface. Run:

- in case of split-2, shut down the current interface only
- in case of split-4, shut down the current interface and the other interface according to the table above

```
switch (config) # interface ethernet 1/1
switch (config interface ethernet 1/1) # shutdown
switch (config interface ethernet 1/1) # exit
switch (config) # interface ethernet 1/4
switch (config interface ethernet 1/4) # shutdown
```

**Step 2.** Split the ports as desired. Run:

```
switch (config interface ethernet 1/4) # module-type qsfp-split-4
switch (config interface ethernet 1/4) #
```

**Step 3.** The following warning will be displayed:  
the following interfaces will be unmapped: 1/4 1/1.  
Choose Yes when prompted Type 'yes' to confirm split

The <ports> field in the warning refers to the affected ports from splitting port <inf> in the applied command.



Please beware that splitting a port into 4 prevents you from accessing the splittable port, and an additional one. For example, in the procedure above, ports 3 and 4 become inaccessible.

### 5.1.1.2 Unsplitting a Split Port

➤ *To unsplit a split port:*

**Step 1.** Shut down all of the split ports. Run:

```
switch (config interface ethernet 1/4/4) # shutdown
switch (config interface ethernet 1/4/4) # exit
switch (config) # interface ethernet 1/4/3
switch (config interface ethernet 1/4/3) # shutdown
switch (config interface ethernet 1/4/3) # exit
switch (config) # interface ethernet 1/4/2
switch (config interface ethernet 1/4/2) # shutdown
switch (config interface ethernet 1/4/2) # exit
switch (config) # interface ethernet 1/4/1
switch (config interface ethernet 1/4/1) # shutdown
```

**Step 2.** From the first member of the split (1/4/1), change the module-type back to QSFP. Run:

```
switch (config interface ethernet 1/4/1) # module-type qsfp
```



The module-type can be changed **only** from the first member of the split and **not** from the interface that was split.

The following warning will be displayed:

The following interfaces will be unmapped: 1/4/1 1/4/2 1/4/3 1/4/4.

**Step 3.** Type “yes” when prompted “Type 'yes' to confirm unsplit.”

### 5.1.2 56GbE Link Speed

Mellanox offers proprietary speed of 56Gbps per Ethernet interface. 56GbE speed is achievable only on 1U Infiniband FDR system (i.e. SX6036F, SX1024, and SX1036).



The following OPNs support 56GbE:

- MSX6036F-xxxx
- MSX1036x-xxxS
- MSX1024x-xxxS
- MSX1012x-xxxx
- MSX6012F-xxxx
- MSX6018F-xxxx

The following OPNs do not support 56GbE:

- MSX6036T-xxxx
- MSX1036x-xxxR
- MSX6012T-xxxx
- MSX6018T-xxxx

#### ➤ *To achieve 56GbE link speed:*

**Step 1.** Make sure your system is 1U FDR capable (i.e. SX6036F, SX1024, and SX1036).



56GbE can only be achieved on 1U FDR capable systems.

**Step 2.** Install 56GbE license. Run:

```
switch (config) # license install <license key>
```

**Step 3.** Install Ethernet license. Run:

```
switch (config) # license install <license key>
```



For a list of the available licenses see [Section 2.4, “Licenses,”](#) on page 39.

**Step 4.** Set the system profile to be eth-single-switch, and reset the system:

```
switch (config) # system profile eth-single-profile
```

**Step 5.** Set the speed for the desired interface to 56GbE as follows. Run:

```
switch (config) # interface ethernet 1/1
switch (config interface ethernet 1/1) # speed 56000
switch (config interface ethernet 1/1) #
```

**Step 6.** Verify the speed is 56GbE

```

switch (config) # show interface ethernet 1/1
Eth1/1
Admin state: Enabled
Operational state: Down
Description: N\A
Mac address: 00:02:c9:5d:e0:26
MTU: 1522 bytes
Flow-control: receive off send off
Actual speed: 56 Gbps
Switchport mode: access
Rx
0 frames
0 unicast frames
0 multicast frames
0 broadcast frames
0 octets
0 error frames
0 discard frames
Tx
0 frames
0 unicast frames
0 multicast frames
0 broadcast frames
0 octets
0 discard frames
switch (config) #

```

**5.1.3 Transceiver Information**

MLNX-OS offers the option of viewing the transceiver information of a module or cable connected to a specific interface. The information is a set of read-only parameters burned onto the EEPROM of the transceiver by the manufacture. The parameters include identifier (connector type), cable type, speed and additional inventory attributes.

➤ **To display transceiver information of a specific interface, run:**

```

switch (config) # show interfaces ethernet 1/60 transceiver
Port 1/60 state
 identifier : QSFP+
 cable/ module type : Passive copper, unequalized
 ethernet speed and type: 56GigE
 vendor : Mellanox
 cable length : 1m
 part number : MC2207130-001
 revision : A3
 serial number : MT1238VS04936
switch (config) #

```



The indicated cable length is rounded up to the nearest natural number.

### 5.1.4 High Power Transceivers

Mellanox switch systems offer high power transceiver (LR4) support in the following ports:

- SX1036/SX1700 – ports 1, 3, 33, 35
- SX1024/SX1400 – ports 50, 52, 54, 56, 58, 60
- SX1012/SX1710 – all ports

If a high power transceiver (e.g. LR4) is inserted to a port that does not support it, the link does not go up, and the following warning message is displayed: “Warning: High power transceiver is not supported” when the command “show interfaces ethernet” is run.

## 5.1.5 Commands

### interface ethernet

**interface ethernet** <slot>/<port>[/<subport>]-[<slot>/<port>[/<subport>]]

Enters the Ethernet interface or Ethernet interface range configuration mode.

|                           |                                                                                                                                                                                               |                                                            |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Syntax Description</b> | <slot>/<port>                                                                                                                                                                                 | Ethernet port number.                                      |
|                           | subport                                                                                                                                                                                       | Ethernet subport number. to be used in case of split port. |
| <b>Default</b>            | N/A                                                                                                                                                                                           |                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                        |                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                      | First version                                              |
|                           | 3.2.1100                                                                                                                                                                                      | Added range support                                        |
| <b>Role</b>               | admin                                                                                                                                                                                         |                                                            |
| <b>Example</b>            | <pre>switch (config) # interface ethernet 1/1 switch (config interface ethernet 1/1) # exit switch (config) # interface ethernet 1/1-1/10 switch (config interface ethernet 1/1-1/10) #</pre> |                                                            |
| <b>Related Commands</b>   | show interfaces ethernet                                                                                                                                                                      |                                                            |
| <b>Note</b>               |                                                                                                                                                                                               |                                                            |

## flowcontrol

**flowcontrol {receive | send} {off | on} [force]**

Enables or disables IEEE 802.3x link-level flow control per direction for the specified interface.

|                           |                                                                                                              |                                                                                                                                                                                                       |
|---------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | receive   send                                                                                               | receive - ingresses direction<br>send - egresses direction                                                                                                                                            |
|                           | off   on                                                                                                     | on - enables IEEE 802.3x link-level flow control for the specified interface on receive or send.<br>off - disables IEEE 802.3x link-level flow control for the specified interface on receive or send |
|                           | force                                                                                                        | Forces command implementation.                                                                                                                                                                        |
| <b>Default</b>            | receive off, send off                                                                                        |                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel             |                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                     |                                                                                                                                                                                                       |
|                           | 3.3.4500                                                                                                     | Added MLAG port-channel configuration mode                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                        |                                                                                                                                                                                                       |
| <b>Example</b>            | switch (config interface ethernet 1/1) # flowcontrol receive off<br>switch (config interface ethernet 1/1) # |                                                                                                                                                                                                       |
| <b>Related Commands</b>   | show interfaces ethernet                                                                                     |                                                                                                                                                                                                       |
| <b>Note</b>               | N/A                                                                                                          |                                                                                                                                                                                                       |



## mtu

### mtu <frame-size>

Configures the Maximum Transmission Unit (MTU) frame size for the interface.

|                           |                                                                                                  |                                            |
|---------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Syntax Description</b> | frame-size                                                                                       | This value may be 1500-9216 bytes.         |
| <b>Default</b>            | 1522 bytes                                                                                       |                                            |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel |                                            |
| <b>History</b>            | 3.1.0000                                                                                         |                                            |
|                           | 3.3.4500                                                                                         | Added MLAG port-channel configuration mode |
| <b>Role</b>               | admin                                                                                            |                                            |
| <b>Example</b>            | switch (config interface ethernet 1/1) # mtu 9216<br>switch (config interface ethernet 1/1) #    |                                            |
| <b>Related Commands</b>   | show interfaces ethernet                                                                         |                                            |
| <b>Note</b>               |                                                                                                  |                                            |

## shutdown

**shutdown**  
**no shutdown**

Disables the interface.  
 The no form of the command enables the interface.

|                           |                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                              |
| <b>Default</b>            | The interface is enabled.                                                                        |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel |
| <b>History</b>            | 3.1.0000<br><br>3.3.4500                      Added MLAG port-channel configuration mode         |
| <b>Role</b>               | admin                                                                                            |
| <b>Example</b>            | switch (config interface ethernet 1/1) # shutdown<br>switch (config interface ethernet 1/1) #    |
| <b>Related Commands</b>   | show interfaces ethernet                                                                         |
| <b>Note</b>               |                                                                                                  |

## description

**description** <string>

**no description**

Sets an interface description.

The no form of the command returns the interface description to its default value.

|                           |                                                                                                               |          |
|---------------------------|---------------------------------------------------------------------------------------------------------------|----------|
| <b>Syntax Description</b> | string                                                                                                        | 40 bytes |
| <b>Default</b>            | ""                                                                                                            |          |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel              |          |
| <b>History</b>            | 3.1.0000<br><br>3.3.4500 Added MLAG port-channel configuration mode                                           |          |
| <b>Role</b>               | admin                                                                                                         |          |
| <b>Example</b>            | switch (config interface ethernet 1/1) # description my-interface<br>switch (config interface ethernet 1/1) # |          |
| <b>Related Commands</b>   | show interfaces ethernet                                                                                      |          |
| <b>Note</b>               |                                                                                                               |          |

## speed

**speed <port speed> [force]**

**no speed**

Sets the speed of the interface.

The no form of the command sets the speed of the interface to its default value.

|                           |                                                                                                                                                                                                                                                                                                       |                                                                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | port speed                                                                                                                                                                                                                                                                                            | 1000 - 1GbE<br>10000 - 10GbE<br>40000 - 40GbE<br>56000 - 56GbE |
|                           | force                                                                                                                                                                                                                                                                                                 | force changing the speed.                                      |
| <b>Default</b>            | Depends on the port module type, see the “Notes” section below.                                                                                                                                                                                                                                       |                                                                |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                       |                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                              |                                                                |
|                           | 3.3.4500                                                                                                                                                                                                                                                                                              | Added MLAG port-channel configuration mode                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                 |                                                                |
| <b>Example</b>            | switch (config interface ethernet 1/1) # speed 40000<br>switch (config interface ethernet 1/1) #                                                                                                                                                                                                      |                                                                |
| <b>Related Commands</b>   | show interfaces ethernet                                                                                                                                                                                                                                                                              |                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• 56Gbps port speed requires a license (LIC-6036F-56GE)</li> <li>• The default speed depends on the interface capabilities, interface capable with 40Gbps will have 40Gbps speed by default</li> <li>• Not all interfaces support all speed options</li> </ul> |                                                                |

## load-interval

**load-interval <time>**

**no load-interval**

Sets the interface counter interval.

The no form of the command resets the interval to its default value.

|                           |                                                                                                       |                                            |
|---------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                  | In seconds.                                |
| <b>Default</b>            | 300 seconds.                                                                                          |                                            |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel      |                                            |
| <b>History</b>            | 3.3.0000                                                                                              |                                            |
|                           | 3.3.4500                                                                                              | Added MLAG port-channel configuration mode |
| <b>Role</b>               | admin                                                                                                 |                                            |
| <b>Example</b>            | switch (config interface ethernet 1/1) # load-interval 30<br>switch (config interface ethernet 1/1) # |                                            |
| <b>Related Commands</b>   | show interfaces ethernet                                                                              |                                            |
| <b>Note</b>               | This interval is used for the ingress rate and egress rate counters.                                  |                                            |

## clear counters

### clear counters

Clears the interface counters.

|                           |                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                      |
| <b>Default</b>            | N/A                                                                                      |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel                               |
| <b>History</b>            | 3.1.0000<br><br>3.3.4500                      Added MLAG port-channel configuration mode |
| <b>Role</b>               | admin                                                                                    |
| <b>Example</b>            | switch (config interface ethernet 1/1) # clear counters                                  |
| <b>Related Commands</b>   | show interfaces ethernet                                                                 |
| <b>Note</b>               |                                                                                          |

## show interfaces ethernet

**show interfaces ethernet <inf> [counters [priority]]**

Displays the configuration and status for the interface.

|                           |          |                                                          |
|---------------------------|----------|----------------------------------------------------------|
| <b>Syntax Description</b> | inf      | Interface number: <slot>/<port>.                         |
|                           | counters | Displays interface extended counters.                    |
|                           | priority | Displays interface extended counters per priority (0-7). |
| <b>Default</b>            | N/A      |                                                          |

**Configuration Mode** Any Command Mode

**History** 3.1.0000

**Role** admin

**Example**

```
switch (config) # show interfaces ethernet 1/1

Eth1/1

Admin state: Enabled
Operational state: Up
Description: N/A
Mac address: 00:02:c9:71:ed:2d
MTU: 1500 bytes(Maximum packet size 1522 bytes)
Flow-control: receive off send off
Actual speed: 40 Gbps
Width reduction mode: Not supported
Switchport mode: access
Last clearing of "show interface" counters 00:20:39
60 seconds Ingress rate: 0 bits/sec, 0 bytes/sec, 0 packets/sec
60 seconds Egress rate: 0 bits/sec, 0 bytes/sec, 0 packets/sec

Rx
 0 packets
 0 unicast packets
 0 multicast packets
 0 broadcast packets
 0 bytes
 0 error packets
 0 discard packets

Tx
63 packets
 0 unicast packets
63 multicast packets
 0 broadcast packets
4032 bytes
 0 discard packets

switch (config) #
```

---

**Related Commands**

---

**Note**

If a high power transceiver (e.g. LR4) is inserted to a port that does not support it, the link does not go up, and the following warning message is displayed: “Warning: High power transceiver is not supported” when running the command “show interfaces ethernet” is run. For more information, please refer to [Section 5.1.4, “High Power Transceivers,” on page 502](#).

---

---



## show interfaces ethernet [<inf>] capabilities

### show interfaces ethernet [<inf>] capabilities

Displays the interface capabilities.

|                           |                                                                                                                                                      |                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | inf                                                                                                                                                  | shows only one interface capabilities.<br>Interface number: <slot>/<port>. |
| <b>Default</b>            | N/A                                                                                                                                                  |                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                     |                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                             |                                                                            |
| <b>Role</b>               | admin                                                                                                                                                |                                                                            |
| <b>Example</b>            | <pre>switch (config) # show interfaces ethernet 1/1 capabilities Eth1/1 Speed      : 10000,40000 FlowControl : Send, Receive switch (config) #</pre> |                                                                            |
| <b>Related Commands</b>   |                                                                                                                                                      |                                                                            |
| <b>Note</b>               |                                                                                                                                                      |                                                                            |

## show interfaces ethernet [<inf>] description

### show interfaces ethernet [<inf>] description

Displays the admin status and protocol status for the specified interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | inf                                                                                                                                                                                                                                                                                                                                                                                                              | Interface number: <slot>/<port>. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |
|                           | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                         | Updated Example                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |
| <b>Example</b>            | <pre>switch (config) # show interfaces ethernet description  Interface           Admin state      Operational state ----- Eth1/58             Enabled          Down Eth1/59             Enabled          Up Eth1/60             Enabled          Down (Suspend) switch (config) # show interfaces ethernet 1/60  Eth1/60      Admin state: Enabled     Operational state: Down (Suspend) switch (config) #</pre> |                                  |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |

## show interfaces ethernet [<inf>] status

### show interfaces ethernet [<inf>] status

Displays the status, speed and negotiation mode of the specified interface.

|                    |                                                   |                                  |         |                |
|--------------------|---------------------------------------------------|----------------------------------|---------|----------------|
| Syntax Description | inf                                               | Interface number: <slot>/<port>. |         |                |
| Default            | N/A                                               |                                  |         |                |
| Configuration Mode | Any Command Mode                                  |                                  |         |                |
| History            | 3.1.0000                                          |                                  |         |                |
|                    | 3.4.1100 Updated Example                          |                                  |         |                |
| Role               | admin                                             |                                  |         |                |
| Example            | switch (config) # show interfaces ethernet status |                                  |         |                |
|                    | Port                                              | Operational state                | Speed   | Negotiation    |
|                    | ----                                              | -----                            | -----   | -----          |
|                    | Eth1/58                                           | Down                             | 40 Gbps | No-Negotiation |
|                    | Eth1/59                                           | Up                               | 40 Gbps | No-Negotiation |
|                    | Eth1/60                                           | Down (Suspend)                   | 40 Gbps | No-Negotiation |
|                    | switch (config) #                                 |                                  |         |                |
| Related Commands   |                                                   |                                  |         |                |
| Note               |                                                   |                                  |         |                |

## show interfaces ethernet [<inf>] transceiver

### show interfaces ethernet [<inf>] transceiver

Displays the transceiver info.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | inf interface number: <slot>/<port>                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # show interfaces ethernet 1/1 transceiver Port 1/1 state     identifier           : QSFP+     cable/module type    : Optical cable/module     ethernet speed and type: 40GBASE - SR4     vendor               : Mellanox     cable_length         : 50 m     part number          : MC2210411-SR4     revision             : A1     serial number        : TT1151-00006 switch (config) #</pre>                  |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>For a full list of the supported cables and transceivers, please refer to the LinkX™ Cables and Transceivers webpage in Mellanox.com: <a href="http://www.mellanox.com/page/cables?mtag=cable_overview">http://www.mellanox.com/page/cables?mtag=cable_overview</a>.</li> <li>If a high power transceiver (e.g. LR4) is used, it will be indicated in the field “cable/module type”.</li> </ul> |

## module-type

### module-type <type> [force]

Splits or un-splits the interface, as desired.

|                           |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                                                                                                                                                                                                                                             | qsfp - Port runs at 40000/56000Mbps.<br>qsfp-split-2 - Port is split and runs at 2X10000Mbps.<br>qsfp-split-4 - Port is split and runs at 4X10000Mbps. |
|                           | force                                                                                                                                                                                                                                                                                                            | force the split operation without asking for user confirmation.                                                                                        |
| <b>Default</b>            | interface module type is qsfp (if the interface supports 40Gbps speed)                                                                                                                                                                                                                                           |                                                                                                                                                        |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                                                                                                                                                                                                                                        |                                                                                                                                                        |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                         |                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                            |                                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config interface ethernet 1/4) # module-type qsfp-split-4 the following interfaces will be unmapped: 1/4 1/1 Type 'yes' to confirm split: yes switch (config interface ethernet 1/4) #</pre>                                                                                                        |                                                                                                                                                        |
| <b>Related Commands</b>   | <pre>switchport mode switchport [trunk   hybrid] allowed-vlan show vlan</pre>                                                                                                                                                                                                                                    |                                                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The affected interfaces should be disabled prior to the operation</li> <li>in order to un-split the interface - used the command with “qsfp”, the speed is set to 40Gbps “module-type qsfp”.</li> <li>This command is applicable only on 40Gbps Ethernet ports</li> </ul> |                                                                                                                                                        |

## 5.2 Link Aggregation Group (LAG)

Link Aggregation protocol describes a network operation in which several same speed links are combined into a single logical entity with the accumulated bandwidth of the originating ports. LAG groups exchange Lag Aggregation Control Protocol (LACP) packets in order to align the functionality between both endpoints of the LAG. To equally send traffic on all LAG links, the switch uses a hash function which can use a set of attributes as key to the hash function.

As many as 16 physical ports can be aggregated on a single LAG.

### 5.2.1 Configuring Static Link Aggregation Group (LAG)

➤ *To configure a static LAG:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a port-channel entity. Run:

```
switch (config) # interface port-channel 1
switch (config interface port-channel 1) #
```

**Step 4.** Change back to config mode.

```
switch (config interface port-channel 1) # exit
switch (config) #
```

**Step 5.** Add a physical port to the port-channel. Run:

```
switch (config interface ethernet 1/4) # channel-group 1 mode on
switch (config interface ethernet 1/4) #
```



If the physical port is operationally up, this port becomes an active member of the aggregation. Consequently, it becomes able to convey traffic.

### 5.2.2 Configuring Link Aggregation Control Protocol (LACP)

➤ *To configure LACP:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a port-channel entity. Run:

```
switch (config) # interface port-channel 1
switch (config interface port-channel 1) #
```

**Step 4.** Change back to config mode. Run:

```
switch (config interface port-channel 1) # exit
switch (config) #
```

**Step 5.** Enable LACP in the switch. Run:

```
switch (config) # lacp
switch (config) #
```

**Step 6.** Add a physical port to the port-channel. Run:

```
switch (config interface ethernet 1/4) # channel-group 1 mode active/passive
switch (config interface ethernet 1/4) #
```

## 5.2.3 Commands

### interface port-channel

**interface port-channel** <1-4096>[-<2-4096>]  
**no interface port-channel** <1-4096>[-<2-4096>]

Creates a LAG and enters the LAG configuration mode. There is an option to create a range of LAG interfaces.

The no form of the command deletes the LAG, or range of LAGs.

|                           |                                                                                                                                                                                                 |                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | 1-4096 / 2-4096                                                                                                                                                                                 | LAG number          |
| <b>Default</b>            | N/A                                                                                                                                                                                             |                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                          |                     |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                        | First version       |
|                           | 3.2.1100                                                                                                                                                                                        | Added range support |
|                           | 3.4.0000                                                                                                                                                                                        | Added note          |
| <b>Role</b>               | admin                                                                                                                                                                                           |                     |
| <b>Example</b>            | <pre>switch (config)# interface port-channel 1 switch (config interface port-channel 1) # exit switch (config)# interface port-channel 1-10 switch (config interface port-channel 1-10) #</pre> |                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                 |                     |
| <b>Note</b>               | If a LAG is also an IPL, attempting to delete it without first deleting the IPL is rejected by the management.                                                                                  |                     |



## lacp

**lacp**  
**no lacp**

Enables LACP in the switch.  
The no form of the command disables LACP in the switch.

|                           |                                           |
|---------------------------|-------------------------------------------|
| <b>Syntax Description</b> | N/A                                       |
| <b>Default</b>            | LACP is disabled.                         |
| <b>Configuration Mode</b> | Config                                    |
| <b>History</b>            | 3.1.1400                                  |
| <b>Role</b>               | admin                                     |
| <b>Example</b>            | switch (config)# lacp<br>switch (config)# |
| <b>Related Commands</b>   |                                           |
| <b>Note</b>               |                                           |

## lacp system-priority

**lacp system-priority <1-65535>**

**no lacp system-priority**

Configures the LACP system priority.

The no form of the command sets the LACP system-priority to default.

|                           |                                                                                                                                                                                                                                                |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | 1-65535                                                                                                                                                                                                                                        | LACP system-priority. |
| <b>Default</b>            | 32768                                                                                                                                                                                                                                          |                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                         |                       |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                       |                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                          |                       |
| <b>Example</b>            | <pre>switch (config)# lacp system-priority 1 switch (config)# show lacp interfaces port-channel Port-channel Module Admin Status is enabled Port-channel System Identifier is 00:02:c9:5c:61:70 LACP System Priority: 3 switch (config)#</pre> |                       |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                |                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                |                       |

## lacp (interface)

**lacp {rate fast | port-priority <1-65535>}**

**no lacp {rate fast | port-priority}**

Configures the LACP interface parameters.

The no form of the command sets the LACP interface configuration to default.

| Syntax Description | rate fast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sets LACP PDUs on the port to be in fast (1 second) or slow rate. (30 seconds). |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------|----------|--------------------|------------|----------|-------------|------------|-----|------|-----|---|---|-----|-----|
|                    | 1-65535                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LACP port-priority.                                                             |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
| Default            | rate - slow (30 seconds)<br>port-priority 32768                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                 |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                 |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                 |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                 |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
| Example            | <pre>switch (config interface ethernet 1/7)# lacp rate fast switch (config interface ethernet 1/7)# show lacp interfaces ethernet 1/7 Port : 1/7 -----  Port State = Down Channel Group : 1 Pseudo port-channel = Po1 LACP port-priority = 32768 LACP Rate = Slow LACP Activity : Passive LACP Timeout : Short  Aggregation State : Aggregation, Defaulted,</pre> <table><tr><th>Port</th><th>State</th><th>LACP Port Priority</th><th>Admin Key</th><th>Oper Key</th><th>Port Number</th><th>Port State</th></tr><tr><td>1/7</td><td>Down</td><td>128</td><td>1</td><td>1</td><td>0x7</td><td>0x0</td></tr></table> <pre>switch (config)#</pre> |                                                                                 | Port      | State    | LACP Port Priority | Admin Key  | Oper Key | Port Number | Port State | 1/7 | Down | 128 | 1 | 1 | 0x7 | 0x0 |
| Port               | State                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LACP Port Priority                                                              | Admin Key | Oper Key | Port Number        | Port State |          |             |            |     |      |     |   |   |     |     |
| 1/7                | Down                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 128                                                                             | 1         | 1        | 0x7                | 0x0        |          |             |            |     |      |     |   |   |     |     |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                 |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |
| Note               | Configuring LACP rate (fast or slow) will configure the peer port to send (fast or slow), it does not make any affect on the local port LACP rate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                 |           |          |                    |            |          |             |            |     |      |     |   |   |     |     |

## port-channel load-balance ethernet

**port-channel load-balance ethernet <method>**  
**no port-channel load-balance ethernet <method>**

Configures the port-channel load balancing distribution function method.  
 The no form of the command sets the distribution function method to default.

|                           |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | method                                                                                                                                                                                                                 | Possible load balance methods: <ul style="list-style-type: none"> <li>• destination-ip</li> <li>• destination-mac</li> <li>• destination-port</li> <li>• source-destination-ip</li> <li>• source-destination-mac</li> <li>• source-destination-port</li> <li>• source-ip</li> <li>• source-mac</li> <li>• source-port</li> </ul> |
| <b>Default</b>            | source-destination-mac                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                  |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config)# port-channel load-balance ethernet destination-ip source-port source-mac switch (config)# show interfaces port-channel load-balance destination-ip,source-mac,source-port switch (config)#</pre> |                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Commands</b>   |                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                  |
| <b>Note</b>               | Several load balance methods can be configured (refer to the example)                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                  |

## channel-group

**channel-group** <1-4096> [mode {on | active | passive}]

**no channel-group**

Assigns and configures a physical interface to a port channel.

The no form of the command removes a physical interface from the port-channel.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | 1-4096                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The port channel number.                                                                      |
|                           | mode on                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Static assignment the port to LAG. LACP will not be enabled on this port.                     |
|                           | mode active/passive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Dynamic assignment of the port to LAG. LACP will be enabled in either passive or active mode. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                               |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                               |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                               |
|                           | 3.4.0008                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Added a note                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                               |
| <b>Example</b>            | switch (config interface 1/7)# channel-group 1 mode active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                               |
| <b>Related Commands</b>   | show interfaces port-channel summary<br>show interfaces port-channel compatibility-parameters<br>show lacp interfaces ethernet                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Setting the mode to active/passive is possible only in LACP is enabled.</li> <li>The first port in the LAG decide if the LAG will be static (“on”) or LACP (“active” , “pasive”).</li> <li>All the ports in the LAG must have the same configuration, determines by the first port added to the LAG. The port with a different configuration will be rejected, for the list of dependencies refer to ‘show interfaces port-channel compatibility-parameters’</li> <li>A physical port may only be part of one channel-group</li> </ul> |                                                                                               |

## lacp-individual enable

**lacp-individual enable [force]**  
**no lacp-individual enable [force]**

Configures the LAG to act with LACP-individual capabilities.  
 The no form of the command disables the LACP-individual capability.

|                           |                                                                                                                                                                                                                              |                                                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | force                                                                                                                                                                                                                        | Toggles the interface after enabling LACP-individual. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                          |                                                       |
| <b>Configuration Mode</b> | Config Interface Port Channel                                                                                                                                                                                                |                                                       |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                     |                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                        |                                                       |
| <b>Example</b>            | switch (config interface port-channel 10)# lacp-individual enable force                                                                                                                                                      |                                                       |
| <b>Related Commands</b>   |                                                                                                                                                                                                                              |                                                       |
| <b>Note</b>               | If a switch is connected via LAG to a host without LACP capability, running this command on that LAG allows a member port (with the lowest numerical priority value), acting as an individual, to communicate with the host. |                                                       |

# show lacp counters

## show lacp counters

Displays the LACP PDUs counters.

|                    |                                                                                                                                                                                                                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | N/A                                                                                                                                                                                                                                                                                          |
| Default            | N/A                                                                                                                                                                                                                                                                                          |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                             |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                     |
| Role               | admin                                                                                                                                                                                                                                                                                        |
| Example            | <pre>switch (config)# show lacp counters LACPDUs      Marker      Marker Response Port         Sent Recv      Sent Recv      Sent Recv Illegal   Unknown ----- Port-channel: 1 ----- 1/7          0    0          0    0          0    0    0    0  switch (config) # switch (config)#</pre> |
| Related Commands   |                                                                                                                                                                                                                                                                                              |
| Note               |                                                                                                                                                                                                                                                                                              |

## show lacp interfaces ethernet

**show lacp interface ethernet <inf>**

Displays the LACP interface configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | inf                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Interface number, for example “1/1”. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |
| <b>Example</b>            | <pre> switch (config) # show lacp interfaces ethernet 1/4 Port : 1/4 -----  Port State = Down Channel Group : 1 Pseudo port-channel = Po1 LACP port-priority = 128 LACP Rate = Slow LACP Activity : Passive LACP Timeout : Short  Aggregation State : Aggregation, Defaulted,  Port      State    LACP Port  Admin  Oper  Port  Port           State    Priority  Key    Key   Number State ----- 1/4      Down     128       1      1     0x4   0x0 switch (config) # </pre> |                                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |



# show lacp interfaces neighbor

## show lacp interfaces neighbor

Displays the LACP interface neighbor status.

|                    |                  |                |
|--------------------|------------------|----------------|
| Syntax Description | N/A              |                |
| Default            | N/A              |                |
| Configuration Mode | Any Command Mode |                |
| History            | 3.1.1400         | First version  |
|                    | 3.4.0000         | Updated output |
| Role               | admin            |                |

**Example**

```

switch (config) # show lacp interfaces neighbor
Flags:
A - Device is in Active mode
P - Device is in Passive mode

Channel group 1 neighbors

Port 1/4

Partner System ID : 00:00:00:00:00:00
Flags : A
LACP Partner Port Priority : 0
LACP Partner Oper Key : 0
LACP Partner Port State : 0x0

Port State Flags Decode

Activity : Active
Aggregation State : Aggregation, Sync, Collecting, Distributing

MLAG channel group 25 neighbors

Port 1/49

Partner System ID : 00:02:c9:fa:c4:c0
Flags : A
LACP Partner Port Priority : 255
LACP Partner Oper Key : 33
LACP Partner Port State : 0xbc

Port State Flags Decode

Activity : Active
Aggregation State : Aggregation, Sync, Collecting, Distributing,

MLAG channel group 28 neighbors

Port 1/51

Partner System ID : f4:52:14:10:d8:f1
Flags : A
LACP Partner Port Priority : 255
LACP Partner Oper Key : 33
LACP Partner Port State : 0xbc

Port State Flags Decode

Activity : Active
Aggregation State : Aggregation, Sync, Collecting, Distributing,

switch (config) #

```

**Related Commands****Note**

## show lacp

### show lacp

Displays the LACP global parameters.

|                           |                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                             |
| <b>Default</b>            | N/A                                                                                             |
| <b>Configuration Mode</b> | Any Command Mode                                                                                |
| <b>History</b>            | 3.4.0000                                                                                        |
| <b>Role</b>               | admin                                                                                           |
| <b>Example</b>            | switch (config) # show lacp<br>Port-channel Module Admin Status is enabled<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                                 |
| <b>Note</b>               |                                                                                                 |

## show lacp interfaces system-identifier

**show lacp interfaces {mlag-port-channel | port-channel} <instance> system-identifier**

Displays the system identifier of LACP.

|                           |                                                                                                                                         |                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | instance                                                                                                                                | LAG or MLAG instance. |
| <b>Default</b>            | N/A                                                                                                                                     |                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                        |                       |
| <b>History</b>            | 3.4.0000                                                                                                                                |                       |
| <b>Role</b>               | admin                                                                                                                                   |                       |
| <b>Example</b>            | switch (config)# show lacp interfaces port-channel 2 system-identifier<br>Priority: 12345<br>MAC: 00:02:C9:AC:2A:60<br>switch (config)# |                       |
| <b>Related Commands</b>   |                                                                                                                                         |                       |
| <b>Note</b>               |                                                                                                                                         |                       |

## show interfaces port-channel

**show interfaces port-channel <port-channel>**

Displays port-channel configuration properties.

| Syntax Description | port-channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LAG interface whose properties to display |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                           |
| History            | 3.3.4000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |
|                    | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Update Example                            |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           |
| Example            | <pre>switch (config) # show interfaces port-channel 2 Po2 Admin state: Enabled Operational state: Up Description: N/A Mac address: 00:00:00:00:00:00 MTU: 9216 bytes (Maximum packet size 9238 bytes) lacp-individual mode: Enabled Flow-control: receive off send off Actual speed: 2 X 40 Gbps Width reduction mode: Not supported Switchport mode: trunk MAC learning mode: Enabled Last clearing of "show interface" counters : Never 60 seconds ingress rate: 2440 bits/sec, 305 bytes/sec, 5 packets/sec 60 seconds egress rate: 2440 bits/sec, 305 bytes/sec, 5 packets/sec  Rx 24060          packets 23447          unicast packets 598            multicast packets 15             broadcast packets 1796876        bytes 0              error packets 0              discard packets  Tx 23961          packets 23454          unicast packets 496            multicast packets 11             broadcast packets 1805778        bytes 4              discard packets switch (config) #</pre> |                                           |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |

## show interfaces port-channel compatibility-parameters

### show interfaces port-channel compatibility-parameters

Displays port-channel parameters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.4000                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # show interfaces port-channel compatibility-parameters * Port-mode * Speed * MTU * Flow Control * Access VLAN * Allowed VLAN list * Flowcontrol &amp; PFC * Channel-group mode * CoS parameters * MAC learning disable  Static configuration on the port should be removed: * ACL port binding * Static mrouter * sflow * OpenFlow * port mirroring local analyzer port * Static mac address switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## show interfaces port-channel load-balance

### show interfaces port-channel load-balance

Displays the type of load-balancing in use for port-channels.

|                           |                                                                                                            |     |
|---------------------------|------------------------------------------------------------------------------------------------------------|-----|
| <b>Syntax Description</b> | N/A                                                                                                        | N/A |
| <b>Default</b>            | N/A                                                                                                        |     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                           |     |
| <b>History</b>            | 3.3.4000                                                                                                   |     |
| <b>Role</b>               | admin                                                                                                      |     |
| <b>Example</b>            | switch (config) # show interfaces port-channel load-balance<br>source-destination-mac<br>switch (config) # |     |
| <b>Related Commands</b>   |                                                                                                            |     |
| <b>Note</b>               |                                                                                                            |     |

## show interfaces port-channel summary

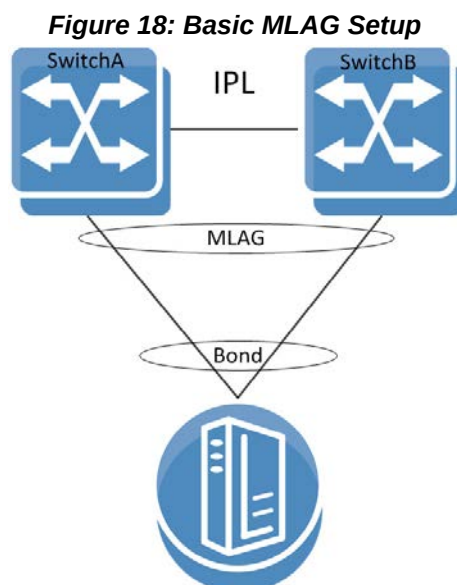
### show interfaces port-channel summary

Displays a summary for the port-channel interfaces.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                           | 3.4.1100 Updated Example                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # show interfaces port-channel summary Flags: D - Down, U - Up, P - Up in port-channel (members)       S - Suspend in port-channel (members), I - Individual</pre> <pre>----- Group Port-      Type      Member Ports Channel ----- 1 Po2(U)         LACP      Eth1/58(D) Eth1/59(I) Eth1/60(S) 2 Po5(D)         LACP      Eth1/1(S)  Eth1/33(I) 3 Po10(U)        LACP      Eth1/49(P) Eth1/50(P) Eth1/51(S) Eth1/52(S) switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



## 5.3 MLAG



All nodes in an MLAG must be of the same CPU type (i.e. PPC or x86).



Each switch configuration is independent and it is user responsibility to make sure to configure both switches similarly pertaining MLAG (e.g. MLAG port-channel VLAN membership, static MAC, ACL, etc).

A link aggregation group (LAG) is used for extending the bandwidth from a single link to multiple links and provide redundancy in case of link failure. Extending the implementation of the LAG to more than a single device provides yet another level of redundancy that extends from the link level to the node level. This extrapolation of the LAG from single to multiple switches is referred to as multi-chassis link aggregation (MLAG).



MLAG is currently supported for only 2 switches.

A peered device (host or switch) connecting to switches running an MLAG runs a standard LAG and is unaware of the fact that the LAG connects to two separate switches.



MLAG links currently mandate disabling xSTP control protocol. However, interfaces not part of an MLAG can run any protocol independently.

The MLAG switches share an inter-peer link (IPL) between them for carrying control messages in a steady state or data packages in failure scenarios. Thus, the bandwidth of the IPL should be

defined accordingly. The IPL itself can be a LAG and be constructed of either 10GbE or 40GbE links. In such a case, PFC must be configured on this IPL. [Figure 19, “Basic MLAG Topology,” on page 540](#) illustrates. The IPL serves the following purposes:

- MLAG protocol control – keepalive messages, MAC sync, MLAG port sync, etc.
- MLAG port failure – serves redundancy in case of a fallen link on one of the MLAG switches.
- Layer-3 failure – serves redundancy in case of a failed connection between the MLAG switches and the rest of the L3 network should there be one.

The MLAG protocol is made up of the following components to be expanded later:

- Keepalive
- Unicast and multicast sync
- MLAG port sync

Upgrading software of an MLAG pair can be done without consideration for master/slave roles. Switches in the same MLAG group must have the same MLNX-OS version.

When positioned at the top of rack (ToR) and connecting with a Layer-3 uplink, the MLAG pair acts as the L3 border for the hosts connected to it. To allow default gateway redundancy, both MLAG switches should be addressed by the host via the same default gateway address.

MLAG uses an IP address (VIP) that is always directed to the MLAG-VIP master node.

When running MLAG with L3, VRRP or MAGP must be deployed. For more information, refer to [Section 6.7, “VRRP,” on page 961](#) or [Section 6.8, “MAGP,” on page 976](#) respectively.



When MLAG is connected through a Layer-2 based uplink, there is no need to apply default gateway redundancy towards hosts since this function is implemented on the L2/L3 border points of the network.

The two peer switches need to carry the exact same configuration of the MLAG attributes for guaranteeing proper functionality of the MLAG.



Ensuring that both switches are configured identically is the responsibility of the user and is not monitored by the MLNX-OS software.



When working with MLAG the maximum number of MAC addresses is limited to 47,970. Without it, the number of MAC addresses would be 55,872.



When transitioning from standalone into a group or vice versa, a few seconds are required for the node state to stabilize. During that time, group features such as Gateway HA, SM HA, and MLAG commands should not be executed. To run group features, wait for the CLI prompt to turn into [standalone:master], [<group>:master] or [<group>:standby] instead of [standalone:\*unknown\*] or [<group>:\*unknown\*].

### 5.3.1 MLAG Keepalive and Failover

Master election in MLAG is based on the IPs of the nodes taking part of the MLAG. The master elected is that which has the higher IPL VLAN Interface.

The MLAG pair of switches periodically exchanges a keepalive message on a user configurable interval. If the keepalive message fails to arrive for three consecutive intervals the switches break into two standalone switches. In such case the remaining active switch begins to act as a standalone switch and assumes that its previously peering MLAG switch has failed.

To avoid a scenario where failure on the IPL causes both MLAG peers to assume that their peer has failed, a safety mechanism based on UDP packets running via the management plane is maintained and alerts both peers of IPL failure. In such a case of IPL failure, the slave shuts down its interfaces to avoid a split brain scenario and the master becomes a standalone switch.

### 5.3.2 Unicast and Multicast Sync

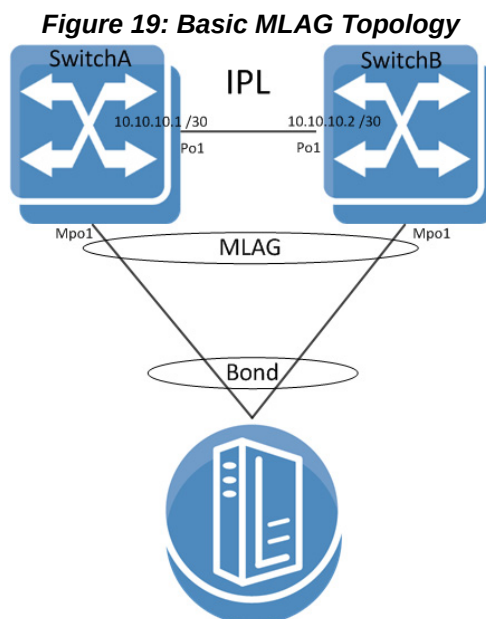
Unicast and multicast sync is a mechanism which syncs the unicast and multicast FDBs of the MLAG peers. It prevents unicast asymmetric traffic from loading the network with flood traffic and multicast traffic from being processed.

### 5.3.3 MLAG Port Sync

Under normal circumstances, traffic from the IPL cannot pass through the MLAG ports (the IPL is isolated from the MLAG ports). If one of the MLAG links break, the other MLAG switch opens that isolation and allows traffic from its peer through the IPL to flow via the MLAG port which accesses the destination of the fallen link.

### 5.3.4 MLAG Configuration

This section provides an example of how to configure two switches and a server in an MLAG setup.



➤ **To configure L2 MLAG:**

Prerequisites:

**Step 1.** Enable IP routing. Run:

```
switch (config)# ip routing
```

**Step 2.** (Recommended) Enable LACP in the switch. Run:

```
switch (config)# lacp
```

**Step 3.** Enable QoS on the switch to avoid congestion on the IPL port. Run:

```
switch (config)# dcb priority-flow-control enable force
```

**Step 4.** Enable the MLAG protocol commands. Run:

```
switch (config)# protocol mlag
```

Configuring the IPL:

**Step 1.** Create a VLAN for the inter-peer link (IPL) to run on. Run:

```
switch (config)# vlan 4000
switch (config vlan 4000)#
```

**Step 2.** Create a LAG. Run:

```
switch (config)# interface port-channel 1
switch (config interface port-channel 1)#
```

**Step 3.** Map a physical port to the LAG in active mode (LACP). Run:

```
switch (config)# interface ethernet 1/1 channel-group 1 mode active
```

**Step 4.** Set this LAG as an IPL. Run:

```
switch (config interface port-channel 1)# ipl 1
```

**Step 5.** Enable QoS on this specific interface. Run:

```
switch (config interface port-channel 1)# dcb priority-flow-control mode on force
```

**Step 6.** Create a VLAN interface. Run:

```
switch (config)# interface vlan 4000
switch (config interface vlan 4000)#
```

**Step 7.** Set an IP address and netmask for the VLAN interface.

On SwitchA, run:

```
switch (config interface vlan 4000)# ip address 10.10.10.1 /30
```

On SwitchB, run:

```
switch (config interface vlan 4000)# ip address 10.10.10.2 /30
```

**Step 8.** Map the VLAN interface to be used on the IPL and set the peer IP address (the IP address of the IPL port on the second switch) of the IPL peer port. IPL peer ports must be configured on the same netmask.

On SwitchA, run:

```
switch (config interface vlan 4000)# ipl 1 peer-address 10.10.10.2
```

On SwitchB, run:

```
switch (config interface vlan 4000)# ipl 1 peer-address 10.10.10.1
```

**Step 9.** Configure a virtual IP (VIP) for the MLAG. Run:

On SwitchA, run:

```
switch (config)# mlag-vip my-vip ip 10.10.10.254 /24 //mask may also be 255.255.255.0
```

On SwitchB, run:

```
switch (config)# mlag-vip my-vip
```

**Step 10.** Configure a virtual system MAC for the MLAG. Run:

```
switch (config)# mlag system-mac 00:00:5E:00:01:5D
```

#### Creating an MLAG interface:

**Step 1.** Create an MLAG interface for the host. Run:

```
switch (config)# interface mlag-port-channel 1
switch (config interface mlag-port-channel 1)#
```

**Step 2.** Disable STP. Run:

```
switch (config interface mlag-port-channel 1)# spanning-tree port type edge
switch (config interface mlag-port-channel 1)# spanning-tree bpdufilter enable
```

**Step 3.** Bind an Ethernet port to the MLAG group. Run:

```
switch (config interface ethernet 1/2)# mlag-channel-group 1 mode on
```

**Step 4.** Create and enable the MLAG interface. Run:

```
switch (config interface mlag-port-channel 1)# no shutdown
```



STP must be disabled (no spanning-tree) on the MLAG switches when there is at least 1 MLAG port-channel connected to a switch and not to a host.

Enabling MLAG:**Step 1.** Enable MLAG. Run:

```
switch [my-vip: master] (config mlag)# no shutdown
```



When running MLAG with L3, VRRP or MAGP must be deployed. For more information, refer to [Section 6.7, “VRRP,”](#) on page 961 or [Section 6.8, “MAGP,”](#) on page 976 respectively.

➤ **To verify MLAG configuration:****Step 1.** Examine MLAG configuration and status. Run:

```
SX2 [mellanox: master] (config)# show mlag
Admin status: Enabled
Operational status: Up
Reload-delay: 1 sec
Keepalive-interval: 30 sec
Upgrade-timeout: 60 min
System-mac: 00:00:5E:00:01:5D

MLAG Ports Configuration Summary:
Configured: 1
 Disabled: 0
 Enabled: 1

MLAG Ports Status Summary:
Inactive: 0
Active-partial: 0
Active-full: 1

MLAG IPLs Summary:
ID Group Vlan Operational Local Peer
 Port-Channel Interface State IP address IP address

1 Po1 1 Up 10.10.10.1 10.10.10.2

Peers state Summary:
System-id State Hostname

F4:52:14:2D:9B:88 Up <SX2>
F4:52:14:2D:9B:08 Up SX1
switch [mellanox: master] (config)#
```

**Step 2.** Examine the MLAG summary table. Run:

```
switch [my-vip: master] (config)# show interfaces mlag-port-channel summary
MLAG Port-Channel Flags: D-Down, U-Up
P-Partial UP, S - suspended by MLAG
Port Flags: D - Down, P - Up in port-channel (members)
S - Suspend in port-channel (members), I - Individual
Group
Port-Channel Type Local Ports Peer Ports
(D/P/S/I) (D/P/S/I) (D/P/S/I)

1 Mpo2(U) Static Eth1/2(P) Eth1/2(P)

switch (config)#
```

**Step 3.** Examine the MLAG statistics. Run:

```
switch [my-vip: master] (config)# show mlag statistics
IPL 1:
Rx Heartbeat : 516
Tx Heartbeat : 516
Rx IGMP tunnel : 0
Tx IGMP tunnel : 0
RX mlag-notification: 0
TX mlag-notification: 0
Rx port-notification : 0
Tx port-notification : 0
Rx FDB sync : 0
Tx FDB sync : 0
RX LACP manager: 1
TX LACP manager: 0
switch (config)#
```

## 5.3.5 Commands

### protocol mlag

**protocol mlag**  
**no protocol mlag**

Enables MLAG functionality and unhides the MLAG commands.  
 The no form of the command hides the MLAG commands and deletes its database.

| Syntax Description        |                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>            | no protocol mlag                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Example</b>            | switch (config) # protocol mlag<br>switch (config) #                                                                                                                                                                                                                                                                                                                              |
| Related Commands          |                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Running the no form of this command hides MLAG commands.</li> <li>MLAG may be enabled without IP routing, but without IP routing an IPL vLAN interface cannot be configured and thus MLAG does not function.</li> <li>MLAG may be enabled without IGMP snooping, but if IGMP snooping is disabled, multi-cast FDBs do not sync.</li> </ul> |



# mlag

|                           |                                                  |
|---------------------------|--------------------------------------------------|
|                           | <b>mlag</b>                                      |
|                           | Enters MLAG configuration mode.                  |
| <b>Syntax Description</b> | N/A                                              |
| <b>Default</b>            | N/A                                              |
| <b>Configuration Mode</b> | Config                                           |
| <b>History</b>            | 3.3.4500                                         |
| <b>Role</b>               | admin                                            |
| <b>Example</b>            | switch (config) # mlag<br>switch (config mlag) # |
| <b>Related Commands</b>   |                                                  |
| <b>Note</b>               |                                                  |

## shutdown

**shutdown**  
**no shutdown**

Enables MLAG.  
The no form of the command disables MLAG.

|                           |                                                              |
|---------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                          |
| <b>Default</b>            | Disabled                                                     |
| <b>Configuration Mode</b> | Config MLAG                                                  |
| <b>History</b>            | 3.3.4500                                                     |
| <b>Role</b>               | admin                                                        |
| <b>Example</b>            | switch (config mlag) # no shutdown<br>switch (config mlag) # |
| <b>Related Commands</b>   |                                                              |
| <b>Note</b>               | This parameter must be similar in all MLAG peers.            |

## interface mlag-port-channel

**interface mlag-port-channel <if-number>**  
**no interface mlag-port-channel <if-number>**

Creates an MLAG interface.  
 The no form of the command deletes the MLAG interface.

|                           |                                                                                                                                                                                                                                                                                       |                                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Syntax Description</b> | if-number                                                                                                                                                                                                                                                                             | Integer. Interface number range: 1-1000. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                   |                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                |                                          |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                              |                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                 |                                          |
| <b>Example</b>            | <pre>switch (config) # interface mlag-port-channel 1 switch (config interface mlag-port-channel 1) #</pre>                                                                                                                                                                            |                                          |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                       |                                          |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• The maximum number of interfaces is 64.</li> <li>• The default Admin state is disabled.</li> <li>• Range configuration is possible on this interface.</li> <li>• This interface number must be the same in all the MLAG switches.</li> </ul> |                                          |

## ipl

**ipl <ipl-id>**  
**no ipl <ipl-id>**

Sets this LAG as an IPL port.  
 The no form of the command resets this LAG as regular LAG.

|                           |                                                                                                                                                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ipl-id<br>IPL ID. Only “1” IPL port is supported.                                                                                                                                                                                                                                                              |
| <b>Default</b>            | no ipl                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface Port Channel                                                                                                                                                                                                                                                                                  |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | switch (config interface port-channel 1)# ipl 1                                                                                                                                                                                                                                                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If a LAG is set as IPL, only the commands “[no] shutdown”, “no ipl” and “no interface port-channel” become applicable.</li> <li>• A LAG interface set as IPL must have default LAG configuration, otherwise the set is rejected. Force option can be used.</li> </ul> |

## ipl peer-address

**ipl <ipl-id> peer-address <IP-Address>**

**no ipl <ipl-id>**

Maps a VLAN interface to be used for an IPL LAG and sets the peer IP address of the IPL peer port.

The no form of the command deletes a peer IPL LAG and unbinds this VLAN interface from the IPL function.

|                    |                                                                                                                                                                             |                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Syntax Description | ipl-id                                                                                                                                                                      | IPL ID. Only “1” IPL port is supported. |
|                    | IP-Address                                                                                                                                                                  | IPv4 address.                           |
| Default            | N/A                                                                                                                                                                         |                                         |
| Configuration Mode | Config Interface VLAN                                                                                                                                                       |                                         |
| History            | 3.3.4500                                                                                                                                                                    |                                         |
| Role               | admin                                                                                                                                                                       |                                         |
| Example            | switch (config interface vlan 1)# ipl 1 peer-address 10.10.10.10<br>switch (config interface vlan 1)#                                                                       |                                         |
| Related Commands   |                                                                                                                                                                             |                                         |
| Note               | <ul style="list-style-type: none"><li>• The subnet mask is the same subnet mask of the VLAN interface.</li><li>• This VLAN interface should be used for IPL only.</li></ul> |                                         |

## keep-alive-interval

**keep-alive-interval <value>**

**no keep-alive-interval**

Configures the interval during which keep-alive messages are issued between the MLAG switches.

The no form of the command resets this parameter to its default value.

|                           |                                                                                |                                |
|---------------------------|--------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | value                                                                          | Time in seconds. Range: 1-300. |
| <b>Default</b>            | 1 second                                                                       |                                |
| <b>Configuration Mode</b> | Config MLAG                                                                    |                                |
| <b>History</b>            | 3.3.4500                                                                       |                                |
| <b>Role</b>               | admin                                                                          |                                |
| <b>Example</b>            | <pre>switch (config mlag) # keep-alive-interval 1 switch (config mlag) #</pre> |                                |
| <b>Related Commands</b>   |                                                                                |                                |
| <b>Note</b>               | This parameter must be similar in all MLAG peers.                              |                                |

## mlag-channel-group mode

**mlag-channel-group** <if-number> mode {on | active | passive}  
**no mlag-channel-group**

Binds an Ethernet port to the MLAG LAG.  
 The no form of the command deletes the binding.

|                           |                                                                                                                 |                                          |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Syntax Description</b> | if-number                                                                                                       | Integer. Interface number range: 1-1000. |
|                           | on                                                                                                              | Binds to static MLAG.                    |
|                           | active                                                                                                          | Sets MLAG LAG in LACP active mode.       |
|                           | passive                                                                                                         | Sets MLAG LAG in LACP passive mode.      |
| <b>Default</b>            | N/A                                                                                                             |                                          |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                                       |                                          |
| <b>History</b>            | 3.3.4500                                                                                                        |                                          |
| <b>Role</b>               | admin                                                                                                           |                                          |
| <b>Example</b>            | switch (config interface ethernet 1/1)# mlag-channel-group 1 mode on<br>switch (config interface ethernet 1/1)# |                                          |
| <b>Related Commands</b>   |                                                                                                                 |                                          |
| <b>Note</b>               |                                                                                                                 |                                          |

## mlag-vip

**mlag-vip** <domain-name> ip [<ip-address> {<masklen> | netmask> [force]]  
**no mlag-vip**

Sets the VIP domain and IP address for MLAG.  
 The no form of the command deletes the VIP domain and IP address.

|                           |                                                                                                                                                                                                                                |                                                                                                   |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | domain-name                                                                                                                                                                                                                    | MLAG group name                                                                                   |
|                           | <ip-address>                                                                                                                                                                                                                   | IP address                                                                                        |
|                           | <masklen>                                                                                                                                                                                                                      | Format example: /24. Note that a space is required between the IP address and the mask.           |
|                           | <netmask>                                                                                                                                                                                                                      | Format example: 255.255.255.0. Note that a space is required between the IP address and the mask. |
|                           | force                                                                                                                                                                                                                          | Forces the IP address if another IP is already configured.                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                            |                                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                         |                                                                                                   |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                       |                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                          |                                                                                                   |
| <b>Example</b>            | switch (config)# mlag-vip my-mlag-domain ip 10.10.10.254/24<br>switch (config)#                                                                                                                                                |                                                                                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                |                                                                                                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This IP address must be configured in one of the MLAG switches and must be in the box management subnet.</li> <li>Other switches in the MLAG must join the same domain name.</li> </ul> |                                                                                                   |



## reload-delay

**reload-delay <value>**

**no reload-delay**

Specifies the amount of time that MLAG ports are disabled after system reboot. The no form of the command resets this parameter to its default value.

|                           |                                                                                                                                                                                                                                                       |                                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | value                                                                                                                                                                                                                                                 | Time in seconds. Range: 0-300. |
| <b>Default</b>            | 30 seconds                                                                                                                                                                                                                                            |                                |
| <b>Configuration Mode</b> | Config MLAG                                                                                                                                                                                                                                           |                                |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                              |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                 |                                |
| <b>Example</b>            | <pre>switch (config mlag) # reload-delay 30 switch (config mlag) #</pre>                                                                                                                                                                              |                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                       |                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This interval allows the switch to learn the IPL topology to identify the master and sync the MAC address before opening the MLAG ports.</li> <li>This parameter must be similar in all MLAG peers.</li> </ul> |                                |

## system-mac

**system-mac** <virtual-mac>  
**no system-mac** <virtual-mac>

Configures virtual system MAC.  
 The no form of the command resets this value to its default value.

| Syntax Description        | virtual-mac                                                                                                                                                            | MAC address |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Default</b>            | Default is calculated according to the MLAG-VIP name, using the base MAC as VRRP MAC prefix (00:00:5E:00:01:xx) with the suffix hashed from the mlag-vip name 0...255. |             |
| <b>Configuration Mode</b> | Config MLAG                                                                                                                                                            |             |
| <b>History</b>            | 3.4.2000                                                                                                                                                               |             |
| <b>Role</b>               | admin                                                                                                                                                                  |             |
| <b>Example</b>            | switch (config mlag) # system-mac 00:00:5E:00:01:5D<br>switch (config mlag) #                                                                                          |             |
| <b>Related Commands</b>   |                                                                                                                                                                        |             |
| <b>Note</b>               |                                                                                                                                                                        |             |

## upgrade-timeout

**mlag upgrade-timeout <time>**  
**no mlag upgrade-timeout**

Configures the time interval at which the MLAG slave keeps its ports active while in upgrading state.

|                           |                                                                          |                                        |
|---------------------------|--------------------------------------------------------------------------|----------------------------------------|
| <b>Syntax Description</b> | time                                                                     | Time in minutes. Range: 0-120 minutes. |
| <b>Default</b>            | 60                                                                       |                                        |
| <b>Configuration Mode</b> | Config MLAG                                                              |                                        |
| <b>History</b>            | 3.4.2000                                                                 |                                        |
| <b>Role</b>               | admin                                                                    |                                        |
| <b>Example</b>            | switch (config mlag) # mlag upgrade-timeout 60<br>switch (config mlag) # |                                        |
| <b>Related Commands</b>   |                                                                          |                                        |
| <b>Note</b>               |                                                                          |                                        |

## show mlag

### show mlag

Displays MLAG configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | <p>3.3.4500</p> <p>3.3.5006 Updated example</p> <p>3.4.2000 Updated example with system MAC and upgrade timeout</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>SX2 [mellanox: master] (config)# show mlag Admin status: Enabled Operational status: Up Reload-delay: 1 sec Keepalive-interval: 30 sec Upgrade-timeout: 60 min System-mac: 00:00:5E:00:01:5D  MLAG Ports Configuration Summary: Configured: 1 Disabled: 0 Enabled: 1  MLAG Ports Status Summary: Inactive: 0 Active-partial: 0 Active-full: 1  MLAG IPLs Summary: ID   Group      Vlan      Operational  Local      Peer    Port-Channel Interface  State      IP address  IP address ----- 1    Po1        1         Up           10.10.10.1  10.10.10.2  MLAG Members Summary: System-id      State  Hostname ----- F4:52:14:2D:9B:88 Up      &lt;SX2&gt; F4:52:14:2D:9B:08 Up      SX1 SX2 [mellanox: master] (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

# show mlag-vip

## show mlag-vip

Displays MLAG VIP configuration and status.

|                    |                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                  |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                     |
| History            | 3.3.4500                                                                                                                                                                                                                                                                                                                                             |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                |
| Example            | <pre>switch (config)# show mlag-vip MLAG VIP ===== MLAG group name: my-mlag-group MLAG VIP address: 1.1.1.1/30 Active nodes: 2  Hostname                VIP-State                IP Address ----- SwitchA                  master                    10.10.10.1 SwitchB                  standby                   10.10.10.2 switch (config)#</pre> |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                      |
| Note               |                                                                                                                                                                                                                                                                                                                                                      |

## show interfaces mlag-port-channel

**show interfaces mlag-port-channel <if-number>**

Displays the MLAG LAG configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre> switch (config)# show interfaces mlag-port-channel 1 Mpo1 Admin state: Enabled Operational state: Down Description: N\A Mac address: 00:00:00:00:00:00 MTU: 1500 bytes (Maximum packet size 1522 bytes) Flow-control: receive off send off Actual speed: 0 Gbps Width reduction mode: Not supported Switchport mode: access Last clearing of "show interface" counters : Never 60 seconds ingress rate: 0 bits/sec, 0 bytes/sec, 0 packets/sec 60 seconds egress rate: 0 bits/sec, 0 bytes/sec, 0 packets/sec Rx 0 packets 0 unicast packets 0 multicast packets 0 broadcast packets 0 bytes 0 error packets 0 discard packets Tx 0 packets 0 unicast packets 0 multicast packets 0 broadcast packets 0 bytes 0 discard packets switch (config)# </pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## show interfaces mlag-port-channel summary

### show interfaces mlag-port-channel summary

Displays MLAG summary table.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                          |                         |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------|-------------------------|
| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |                          |                         |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |                          |                         |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |                          |                         |
| History            | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | First version                   |                          |                         |
|                    | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Added notes and updated example |                          |                         |
|                    | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Updated Example                 |                          |                         |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                          |                         |
| Example            | switch [my-vip: standby] (config)# show interfaces mlag-port-channel summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |                          |                         |
|                    | MLAG Port-Channel Flags: D-Down, U-Up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                          |                         |
|                    | P-Partial UP, S - Suspended by MLAG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |                          |                         |
|                    | Port Flags: D - Down, P - Up in port-channel (members)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                          |                         |
|                    | S - Suspend in port-channel (members), I - Individual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                          |                         |
|                    | Group                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                          |                         |
|                    | Port-Channel<br>(D/U/P/S)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Type                            | Local Ports<br>(D/P/S/I) | Peer Ports<br>(D/P/S/I) |
|                    | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                          |                         |
|                    | 1 Mpo2(U)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Static                          | Eth1/2(P)                | Eth1/2(P)               |
|                    | 2 Mpo3(U)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Static                          | Eth1/4(P)                | Eth1/8(P)               |
|                    | 3 Mpo4(U)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LACP                            | Eth1/5(P)                | Eth1/5(P)               |
|                    | switch (config)#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |                          |                         |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                          |                         |
| Note               | <ul style="list-style-type: none"><li>• If a cluster is not available, the column “Peer Ports” shows “N/A”. If the cluster is available but is not configured on the peer, the “Peer Ports” column shows nothing.</li><li>• If the system happens to be busy, peer ports may be unavailable and the following prompt may appear in the output: “System busy and partial information is presented – please try again later”.</li><li>• The “I” flag indicates an interface which is part of a port-channel and in individual state</li><li>• The “S” flag indicates an interface which is part of a port-channel and in suspended state</li></ul> |                                 |                          |                         |

## show mlag statistics

### show mlag statistics

Displays the MLAG IPL counters.

|                           |                                                                                                                                                                                                                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                   |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                           |
|                           | 3.4.0000 Updated example                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                              |
| <b>Example</b>            | <pre>switch (config)# show mlag statistics IPL 1: RX Heartbeat: 439908 TX Heartbeat: 439951 RX IGMP tunnel: 0 TX IGMP tunnel: 1 RX mlag-notification: 0 TX mlag-notification: 12 RX port-notification: 56 TX port-notification: 73 RX FDB sync: 424 TX FDB sync: 778 RX LACP manager: 38 TX LACP manager: 21</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                    |



## 5.4 VLANs

A Virtual Local Area Network (VLAN) is an L2 segment of the network which defines a broadcast domain and is identified by a tag added to all Ethernet frames running within the domain. This tag is called a VLAN ID (VID) and can take a value of 1-4094.

Each port can have a switch mode of either:

- Access – Access port is a port connected to a host. It can accept only untagged frames, and assigns them a default configured VLAN (Port VLAN ID). On egress, traffic sent from the access port is untagged.
- Access-dcb – This mode is Mellanox specific that receives ingress untagged traffic but sends egress priority tag (VLAN ID = 0)
- Hybrid – Hybrid port is a port connected to either switches or hosts. It can receive both tagged and untagged frames and assigns untagged frames a default configured VLAN (Port VLAN ID). It receives tagged frames with VLANs of which the port is a member (these VLANs' names are allowed). On egress, traffic of allowed VLANs sent from the Hybrid port is sent tagged, while traffic sent with PVID is untagged.
- Trunk – Trunk port is a port connecting 2 switches. It accepts only tagged frames with VLANs of which the port is a member. On egress, traffic sent from the Trunk port is tagged. By default, a Trunk port is, automatically, a member on all current VLANs.

### 5.4.1 Configuring Access Mode and Assigning Port VLAN ID (PVID)

➤ *To configure Access mode and assign PVID to interfaces:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a VLAN. Run:

```
switch (config) # vlan 6
switch (config vlan 6) #
```

**Step 4.** Change back to config mode. Run:

```
switch (config vlan 6) # exit
switch (config) #
```

**Step 5.** Enter the interface context. Run:

```
switch (config) # interface ethernet 1/36
switch (config interface ethernet 1/36) #
```

**Step 6.** From within the interface context, configure the interface mode to Access. Run:

```
switch (config interface ethernet 1/36) # switchport mode access
switch (config interface ethernet 1/36) #
```

**Step 7.** From within the interface context, configure the Access VLAN membership. Run:

```
switch (config interface ethernet 1/36) # switchport access vlan 6
switch (config interface ethernet 1/36) #
```

**Step 8.** Change back to config mode. Run:

```
switch (config interface ethernet 1/36) # exit
switch (config) #
```

## 5.4.2 Configuring Hybrid Mode and Assigning Port VLAN ID (PVID)

➤ *To configure Hybrid mode and assign PVID to interfaces:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a VLAN. Run:

```
switch (config) # vlan 6
switch (config vlan 6) #
```

**Step 4.** Change back to config mode. Run:

```
switch (config vlan 6) # exit
switch (config) #
```

**Step 5.** Enter the interface context. Run:

```
switch (config) # interface ethernet 1/36
switch (config interface ethernet 1/36) #
```

**Step 6.** From within the interface context, configure the interface mode to Access. Run:

```
switch (config interface ethernet 1/36) # switchport mode hybrid
switch (config interface ethernet 1/36) #
```

**Step 7.** From within the interface context, configure the Access VLAN membership. Run:

```
switch (config interface ethernet 1/36) # switchport hybrid vlan 6
switch (config interface ethernet 1/36) #
```

**Step 8.** Change to config mode again. Run:

```
switch (config interface ethernet 1/36) # exit
switch (config) #
```

## 5.4.3 Configuring Trunk Mode VLAN Membership

➤ *To configure Trunk mode VLAN membership:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a VLAN. Run:

```
switch (config) # vlan 10
switch (config vlan 10) #
```

**Step 4.** Change back to config mode. Run:

```
switch (config vlan 10) # exit
switch (config) #
```

**Step 5.** Enter the interface context. Run:

```
switch [standalone: master] (config) # interface ethernet 1/35
switch [standalone: master] (config interface ethernet 1/35) #
```

**Step 6.** From within the interface context, configure the interface mode to Trunk. Run:

```
switch [standalone: master] (config interface ethernet 1/35) # switchport mode trunk
switch [standalone: master] (config interface ethernet 1/35) #
```

#### 5.4.4 Configuring Hybrid Mode VLAN Membership

➤ *To configure Hybrid mode VLAN membership:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a VLAN. Run:

```
switch (config) # vlan 10
switch (config vlan 10) #
```

**Step 4.** Change back to config mode. Run:

```
switch (config vlan 10) # exit
switch (config) #
```

**Step 5.** Enter the interface context. Run:

```
switch (config) # interface ethernet 1/35
switch (config interface ethernet 1/35) #
```

**Step 6.** From within the interface context, configure the interface mode to Hybrid. Run:

```
switch (config interface ethernet 1/35) # switchport mode hybrid
switch (config interface ethernet 1/35) #
```

**Step 7.** From within the interface context, configure the allowed VLAN membership. Run:

```
switch (config interface ethernet 1/35) # switchport hybrid allowed-vlan add 10
switch (config interface ethernet 1/35) #
```

**Step 8.** Change to config mode again. Run:

```
switch (config interface ethernet 1/35) # exit
switch (config) #
```

## 5.4.5 Commands

### vlan

**vlan** {<vlan-id> | <vlan-range>}  
**no vlan** {<vlan-id> | <vlan-range>}

Creates a VLAN or range of VLANs, and enters a VLAN context.  
 The no form of the command deletes the VLAN or VLAN range.

| <b>Syntax Description</b> | vlan-id                                                                                                                                                                                                                                                                | 1-4094.                                |      |      |       |   |         |                                        |    |  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------|------|-------|---|---------|----------------------------------------|----|--|
|                           | vlan-range                                                                                                                                                                                                                                                             | Any range of VLANs.                    |      |      |       |   |         |                                        |    |  |
| <b>Default</b>            | VLAN 1 is enabled by default.                                                                                                                                                                                                                                          |                                        |      |      |       |   |         |                                        |    |  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                 |                                        |      |      |       |   |         |                                        |    |  |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                               |                                        |      |      |       |   |         |                                        |    |  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                  |                                        |      |      |       |   |         |                                        |    |  |
| <b>Example</b>            | <pre>switch (config) # vlan 10 switch (config vlan 10) # show vlan</pre>                                                                                                                                                                                               |                                        |      |      |       |   |         |                                        |    |  |
|                           | <table> <thead> <tr> <th>VLAN</th><th>Name</th><th>Ports</th></tr> </thead> <tbody> <tr> <td>1</td><td>default</td><td>Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2 ...</td></tr> <tr> <td>10</td><td></td><td></td></tr> </tbody> </table> <pre>switch (config vlan 10) #</pre> |                                        | VLAN | Name | Ports | 1 | default | Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2 ... | 10 |  |
| VLAN                      | Name                                                                                                                                                                                                                                                                   | Ports                                  |      |      |       |   |         |                                        |    |  |
| 1                         | default                                                                                                                                                                                                                                                                | Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2 ... |      |      |       |   |         |                                        |    |  |
| 10                        |                                                                                                                                                                                                                                                                        |                                        |      |      |       |   |         |                                        |    |  |
| <b>Related Commands</b>   | <pre>show vlan switchport mode switchport [trunk   hybrid] allowed-vlan</pre>                                                                                                                                                                                          |                                        |      |      |       |   |         |                                        |    |  |
| <b>Note</b>               | Interfaces are not added automatically to VLAN unless configured with trunk or hybrid mode with “all” option turned on.                                                                                                                                                |                                        |      |      |       |   |         |                                        |    |  |

## name

**name** <vlan-name>

**no name**

Adds VLAN name.

The no form of the command deletes the VLAN name.

| <b>Syntax Description</b> | vlan-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40-character long string.                                                             |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------|------|-------|---|---------|---------------------------------------------|-----|--|---------------------------------------------------------------------------------------|-----|--|----------------------------------------------|-----|--|----------------------------------------------|-----|--|----------------------------------------------|-----|--|----------------------------------------------|----|--------------|-----------------------|
| <b>Default</b>            | No name available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                       |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| <b>Configuration Mode</b> | Config VLAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                       |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| <b>Example</b>            | <pre>switch (config) # vlan 10 switch (config vlan 10) # name my-vlan-name switch (config vlan 10) # show vlan</pre> <table> <thead> <tr> <th>VLAN</th><th>Name</th><th>Ports</th></tr> </thead> <tbody> <tr> <td>1</td><td>default</td><td>Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2, Eth1/5,</td></tr> <tr> <td>15,</td><td></td><td>Eth1/6, Eth1/7, Eth1/8, Eth1/9, Eth1/10, Eth1/11, Eth1/12, Eth1/13, Eth1/14, Eth1/15,</td></tr> <tr> <td>20,</td><td></td><td>Eth1/16, Eth1/17, Eth1/18, Eth1/19, Eth1/20,</td></tr> <tr> <td>25,</td><td></td><td>Eth1/21, Eth1/22, Eth1/23, Eth1/24, Eth1/25,</td></tr> <tr> <td>30,</td><td></td><td>Eth1/26, Eth1/27, Eth1/28, Eth1/29, Eth1/30,</td></tr> <tr> <td>35,</td><td></td><td>Eth1/31, Eth1/32, Eth1/33, Eth1/34, Eth1/35,</td></tr> <tr> <td>10</td><td>my-vlan-name</td><td>Eth1/36, Po34, Po4096</td></tr> </tbody> </table> |                                                                                       | VLAN | Name | Ports | 1 | default | Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2, Eth1/5, | 15, |  | Eth1/6, Eth1/7, Eth1/8, Eth1/9, Eth1/10, Eth1/11, Eth1/12, Eth1/13, Eth1/14, Eth1/15, | 20, |  | Eth1/16, Eth1/17, Eth1/18, Eth1/19, Eth1/20, | 25, |  | Eth1/21, Eth1/22, Eth1/23, Eth1/24, Eth1/25, | 30, |  | Eth1/26, Eth1/27, Eth1/28, Eth1/29, Eth1/30, | 35, |  | Eth1/31, Eth1/32, Eth1/33, Eth1/34, Eth1/35, | 10 | my-vlan-name | Eth1/36, Po34, Po4096 |
| VLAN                      | Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ports                                                                                 |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 1                         | default                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2, Eth1/5,                                           |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 15,                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Eth1/6, Eth1/7, Eth1/8, Eth1/9, Eth1/10, Eth1/11, Eth1/12, Eth1/13, Eth1/14, Eth1/15, |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 20,                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Eth1/16, Eth1/17, Eth1/18, Eth1/19, Eth1/20,                                          |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 25,                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Eth1/21, Eth1/22, Eth1/23, Eth1/24, Eth1/25,                                          |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 30,                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Eth1/26, Eth1/27, Eth1/28, Eth1/29, Eth1/30,                                          |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 35,                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Eth1/31, Eth1/32, Eth1/33, Eth1/34, Eth1/35,                                          |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| 10                        | my-vlan-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Eth1/36, Po34, Po4096                                                                 |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| <b>Related Commands</b>   | <pre>show vlan switchport mode switchport [trunk   hybrid] allowed-vlan</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                       |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |
| <b>Note</b>               | Name can not be added to a range of VLANs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                       |      |      |       |   |         |                                             |     |  |                                                                                       |     |  |                                              |     |  |                                              |     |  |                                              |     |  |                                              |    |              |                       |

## show vlan

### show vlan [id <vlan-id>]

Displays the VLAN table.

| <b>Syntax Description</b> | vlan-id                                                                                                                                                                                                                                                                                      | 1-4094.                                |      |      |       |   |         |                                        |    |              |  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------|------|-------|---|---------|----------------------------------------|----|--------------|--|
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                          |                                        |      |      |       |   |         |                                        |    |              |  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                             |                                        |      |      |       |   |         |                                        |    |              |  |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                     |                                        |      |      |       |   |         |                                        |    |              |  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                        |                                        |      |      |       |   |         |                                        |    |              |  |
| <b>Example</b>            | <pre>switch (config vlan 10) # show vlan</pre> <table> <thead> <tr> <th>VLAN</th><th>Name</th><th>Ports</th></tr> </thead> <tbody> <tr> <td>1</td><td>default</td><td>Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2 ...</td></tr> <tr> <td>10</td><td>my-vlan-name</td><td></td></tr> </tbody> </table> |                                        | VLAN | Name | Ports | 1 | default | Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2 ... | 10 | my-vlan-name |  |
| VLAN                      | Name                                                                                                                                                                                                                                                                                         | Ports                                  |      |      |       |   |         |                                        |    |              |  |
| 1                         | default                                                                                                                                                                                                                                                                                      | Eth1/2, Eth1/3, Eth1/4/1, Eth1/4/2 ... |      |      |       |   |         |                                        |    |              |  |
| 10                        | my-vlan-name                                                                                                                                                                                                                                                                                 |                                        |      |      |       |   |         |                                        |    |              |  |
| <b>Related Commands</b>   | <pre>show vlan switchport mode switchport [trunk   hybrid] allowed-vlan vlan</pre>                                                                                                                                                                                                           |                                        |      |      |       |   |         |                                        |    |              |  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                              |                                        |      |      |       |   |         |                                        |    |              |  |

## switchport mode

**switchport mode {access | trunk | hybrid | access-dcb}**

**no switchport mode**

Sets the switch port mode.

The no form of the command sets the switch port mode to access.

| Syntax Description | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Untagged port. 802.1q tagged traffic are filtered. Egress traffic is untagged. |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------|-----------|------|-------------|---------------|--------|--------|---|--|--------|--------|---|--|----------|--------|---|--|----------|--------|---|--|--------|--------|---|--|--------|--------|---|--|------|--|--|--|------|--------|---|--|--------|--------|---|--|
|                    | trunk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 802.1q tagged port, untagged traffic is filtered.                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
|                    | hybrid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Both 802.1q tagged and untagged traffic is allowed on the port.                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
|                    | access-dcb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Untagged port, egress traffic is priority tagged.                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Default            | access.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Configuration Mode | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
|                    | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Added MLAG port-channel configuration mode                                     |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Example            | <pre>switch (config) # interface ethernet 1/7 switch (config interface ethernet 1/7) # switchport mode access switch (config interface ethernet 1/7) # show interfaces switchport</pre> <table><thead><tr><th>Interface</th><th>Mode</th><th>Access vlan</th><th>Allowed vlans</th></tr></thead><tbody><tr><td>Eth1/2</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/3</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/4/1</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/4/2</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/5</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/6</td><td>access</td><td>1</td><td></td></tr><tr><td>....</td><td></td><td></td><td></td></tr><tr><td>Po34</td><td>access</td><td>1</td><td></td></tr><tr><td>Po4096</td><td>access</td><td>1</td><td></td></tr></tbody></table> <pre>switch (config interface ethernet 1/7) #</pre> |                                                                                |               | Interface | Mode | Access vlan | Allowed vlans | Eth1/2 | access | 1 |  | Eth1/3 | access | 1 |  | Eth1/4/1 | access | 1 |  | Eth1/4/2 | access | 1 |  | Eth1/5 | access | 1 |  | Eth1/6 | access | 1 |  | .... |  |  |  | Po34 | access | 1 |  | Po4096 | access | 1 |  |
| Interface          | Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Access vlan                                                                    | Allowed vlans |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/2             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/3             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/4/1           | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/4/2           | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/5             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/6             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| ....               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Po34               | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Po4096             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                              |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Related Commands   | show vlan<br>show interfaces switchport<br>switchport access vlan<br>switchport [trunk   hybrid] allowed-vlan<br>vlan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                |               |           |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |      |  |  |  |      |        |   |  |        |        |   |  |

## switchport access

**switchport access vlan <vlan-id>**

**no switchport access vlan**

Sets the port access VLAN.

The no form of the command sets the port access VLAN to 1.

| Syntax Description | vlan-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1-4094.                                                                                                                                        |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|-------------|---------------|--------|--------|---|--|--------|--------|---|--|----------|--------|---|--|----------|--------|---|--|--------|--------|---|--|--------|--------|---|--|--------|--------|----|--|------|--|--|--|--------|--------|---|--|
| Default            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Configuration Mode | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | First version                                                                                                                                  |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
|                    | 3.2.0500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Format change (removed hybrid and access-dcb options). Previous command format was: “switchport {hybrid   access-dcb   access} vlan <vlan-id>” |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
|                    | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Added MLAG port-channel configuration mode                                                                                                     |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Example            | <pre>switch (config) # interface ethernet 1/7 switch (config interface ethernet 1/7) # switchport access vlan 10 switch (config interface ethernet 1/7) # show interfaces switchport</pre> <table><thead><tr><th>Interface</th><th>Mode</th><th>Access vlan</th><th>Allowed vlans</th></tr></thead><tbody><tr><td>Eth1/2</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/3</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/4/1</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/4/2</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/5</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/6</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/7</td><td>access</td><td>10</td><td></td></tr><tr><td>....</td><td></td><td></td><td></td></tr><tr><td>Po4096</td><td>access</td><td>1</td><td></td></tr></tbody></table> <pre>switch (config interface ethernet 1/7) #</pre> |                                                                                                                                                | Interface     | Mode | Access vlan | Allowed vlans | Eth1/2 | access | 1 |  | Eth1/3 | access | 1 |  | Eth1/4/1 | access | 1 |  | Eth1/4/2 | access | 1 |  | Eth1/5 | access | 1 |  | Eth1/6 | access | 1 |  | Eth1/7 | access | 10 |  | .... |  |  |  | Po4096 | access | 1 |  |
| Interface          | Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Access vlan                                                                                                                                    | Allowed vlans |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/2             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/3             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/4/1           | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/4/2           | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/5             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/6             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Eth1/7             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10                                                                                                                                             |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| ....               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Po4096             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1                                                                                                                                              |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Related Commands   | show vlan<br>show interfaces switchport<br>switchport mode<br>switchport [trunk   hybrid] allowed-vlan<br>vlan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |
| Note               | This command is not applicable for interfaces with port mode trunk.<br>only one option (“access”, “access-dcb” or “hybrid”) is applicable to configure on the port, depends on the switchport mode of the port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                |               |      |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |    |  |      |  |  |  |        |        |   |  |



## switchport {hybrid, trunk} allowed-vlan

**switchport {hybrid, trunk} allowed-vlan {<vlan> | add <vlan> | remove <vlan> all | except <vlan> | none}**

Sets the port allowed VLANs.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | vlan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | VLAN ID (1-4094) or VLAN range.                                                                           |
|                           | add                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Adds VLAN or range of VLANs.                                                                              |
|                           | remove                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Removes VLANs or range of VLANs.                                                                          |
|                           | all                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Adds all VLANs in available in the VLAN table. New VLANs added to the VLAN table are added automatically. |
|                           | except                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Adds all VLANs expect this VLAN or VLAN range.                                                            |
|                           | none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Removes all VLANs.                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                           |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                           |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # interface ethernet 1/7 switch (config interface ethernet 1/7) # switchport hybrid allowed-vlan all switch (config interface ethernet 1/7) #show interfaces switchport Interface        Mode        Access vlan        Allowed vlans ----- ----- ----- ----- Eth1/2      access           1             Eth1/3      access           1             Eth1/4/1     access           1             Eth1/4/2     access           1             Eth1/5       access           1             Eth1/6       access           1             Eth1/7       hybrid           1             1, 10 .... Po34        access           1             Po4096      access           1             switch (config interface ethernet 1/7) #</pre> |                                                                                                           |
| <b>Related Commands</b>   | <pre>show vlan show interfaces switchport switchport access vlan switchport mode vlan</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                           |
| <b>Note</b>               | This command is not applicable for interfaces with port mode access or access-dcb.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                           |

## show interface switchport

### show interface switchport

Displays all interface switch port configurations.

| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|-------------|---------------|--------|--------|---|--|--------|--------|---|--|----------|--------|---|--|----------|--------|---|--|--------|--------|---|--|--------|--------|---|--|--------|--------|---|-------|------|--|--|--|------|--------|---|--|--------|--------|---|--|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Example            | <pre>switch (config) #show interfaces switchport</pre> <table><thead><tr><th>Interface</th><th>Mode</th><th>Access vlan</th><th>Allowed vlans</th></tr></thead><tbody><tr><td>Eth1/2</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/3</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/4/1</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/4/2</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/5</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/6</td><td>access</td><td>1</td><td></td></tr><tr><td>Eth1/7</td><td>hybrid</td><td>1</td><td>1, 10</td></tr><tr><td>....</td><td></td><td></td><td></td></tr><tr><td>Po34</td><td>access</td><td>1</td><td></td></tr><tr><td>Po4096</td><td>access</td><td>1</td><td></td></tr></tbody></table> <pre>switch (config)#</pre> | Interface   | Mode          | Access vlan | Allowed vlans | Eth1/2 | access | 1 |  | Eth1/3 | access | 1 |  | Eth1/4/1 | access | 1 |  | Eth1/4/2 | access | 1 |  | Eth1/5 | access | 1 |  | Eth1/6 | access | 1 |  | Eth1/7 | hybrid | 1 | 1, 10 | .... |  |  |  | Po34 | access | 1 |  | Po4096 | access | 1 |  |
| Interface          | Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Access vlan | Allowed vlans |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/2             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/3             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/4/1           | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/4/2           | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/5             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/6             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Eth1/7             | hybrid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           | 1, 10         |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| ....               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Po34               | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Po4096             | access                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1           |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Related Commands   | <pre>show vlan switchport access vlan switchport mode vlan</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |               |             |               |        |        |   |  |        |        |   |  |          |        |   |  |          |        |   |  |        |        |   |  |        |        |   |  |        |        |   |       |      |  |  |  |      |        |   |  |        |        |   |  |

## 5.5 MAC Address Table

### 5.5.1 Configuring Unicast Static MAC Address

You can configure static MAC addresses for unicast traffic. This feature improves security and reduces unknown unicast flooding.

➤ **To configure Unicast Static MAC address:**

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Run the command `mac-address-table static unicast <destination mac address> vlan <vlan identifier(1-4094)> interface ethernet <slot>/ <port>`.

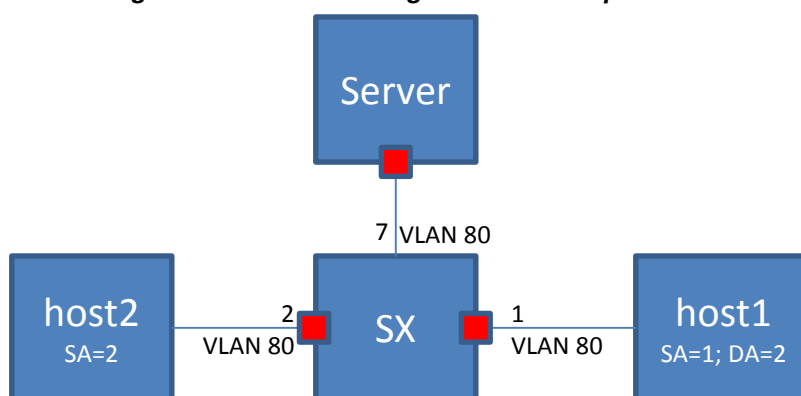
```
switch (config) # mac-address-table static unicast 00:11:22:33:44:55 vlan 1 interface
ethernet 0/1
```

### 5.5.2 MAC Learning Considerations

MAC learning may be disabled using the command `mac-learning disable` which is beneficial in the following situations:

- To prevent denial-of-service attacks
- To manage the available MAC address table space by controlling which interfaces can learn MAC addresses
- To duplicate to a dedicated server (port7) all the packets that one host (host1; port1) sends to another (host2; port2), like in port mirroring. To accomplish this, MAC learning is disabled on port2. In this case the FDB does not obtain the MAC address of host2. Also, to prevent broadcast to every port, it is possible to configure a VLAN (VLAN 80) which ports 1, 2 and 7 are member of.

**Figure 20: MAC Learning Disable Example Case**



### 5.5.3 Commands

#### mac-address-table aging-time

**mac-address-table aging-time <age>**  
**no mac-address-table aging-time**

Sets the maximum age of a dynamically learnt entry in the MAC address table.  
 The no form of the command resets the aging time of the MAC address table to its default.

|                           |                                                                                                                                                                 |                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | age                                                                                                                                                             | 10-1000000 seconds. |
| <b>Default</b>            | 300                                                                                                                                                             |                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                          |                     |
| <b>History</b>            | 3.1.0600                                                                                                                                                        |                     |
| <b>Role</b>               | admin                                                                                                                                                           |                     |
| <b>Example</b>            | <pre>switch (config) # mac-address-table aging-time 50 switch (config) # show mac-address-table aging-time  Mac Address Aging Time: 50  switch (config) #</pre> |                     |
| <b>Related Commands</b>   | <pre>show mac-address-table show mac-address-table aging time</pre>                                                                                             |                     |
| <b>Note</b>               |                                                                                                                                                                 |                     |

## mac-address-table static

**mac-address-table static** <mac address> vlan <vlan> interface <if-type> <if-number>

**no mac-address-table static** <mac address> vlan <vlan> interface <if-type> <if-number>

Configures a static MAC address in the forwarding database.

The no form of the command deletes a configured static MAC address from the forwarding database.

|                           |                                                                                                                                                                                                                                                                                                                                                                |                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Syntax Description</b> | mac address                                                                                                                                                                                                                                                                                                                                                    | Destination MAC address.                 |
|                           | vlan                                                                                                                                                                                                                                                                                                                                                           | VLAN ID or VLAN range.                   |
|                           | if-type                                                                                                                                                                                                                                                                                                                                                        | Ethernet or port-channel interface type. |
|                           | if-number                                                                                                                                                                                                                                                                                                                                                      | The interface number (i.e. 1/1, 3).      |
| <b>Default</b>            | No static MAC addresses available in default.                                                                                                                                                                                                                                                                                                                  |                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                         |                                          |
| <b>History</b>            | 3.1.0600                                                                                                                                                                                                                                                                                                                                                       |                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                          |                                          |
| <b>Example</b>            | <pre>switch (config) # mac-address-table static aa:aa:aa:aa:aa:aa vlan 1 interface ethernet 1/7 switch (config) # show mac-address-table  Switch ethernet-default  Vlan      Mac Address          Type      Interface ----      - 1          aa:aa:aa:aa:aa:aa    static    Eth1/7 Number of unicast:      1 Number of multicast:    0 switch (config) #</pre> |                                          |
| <b>Related Commands</b>   | <pre>show mac-address-table mac-address-table aging time</pre>                                                                                                                                                                                                                                                                                                 |                                          |
| <b>Note</b>               | The no form of the command will not clear a dynamic MAC address. Dynamic MAC addresses are cleared using the “clear mac-address-table dynamic” command.                                                                                                                                                                                                        |                                          |

## mac-learning disable

**mac-learning disable**  
**no mac-learning disable**

Disables MAC-address learning.  
 The no form of the command enables MAC-address learning.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Default</b>            | Enabled                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0600                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | switch (config interface ethernet 1/1) # mac-learning disable                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• When adding a port to a LAG, the port needs to be aligned with the LAG's configuration</li> <li>• When removing a port from a LAG, the port remains in whichever configuration the LAG is in</li> <li>• Disabling MAC learning is not supported on a local analyzer port.</li> <li>• Disabling MAC learning is not supported on an IPL LAG.</li> </ul> |

## clear mac-address-table dynamic

### clear mac-address-table dynamic

Clear the dynamic entries in the MAC address table.

|                           |                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                               |
| <b>History</b>            | 3.1.0600                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # clear mac-address-table dynamic switch (config) #</pre>                                                                       |
| <b>Related Commands</b>   | mac-address-table aging-time<br>mac-address-table static<br>show mac-address-table                                                                   |
| <b>Note</b>               | This command does not clear the MAC addresses learned on the mgmt0 port. Static entries are deleted using the “no mac-address-table static” command. |

## show mac-address-table

**show mac-address-table** [**address** <mac-address> | **interface ethernet** <if-number> | **vlan** [<vlan> | **range** <range>] | **unicast** | **multicast**]

Displays the static and dynamic unicast and multicast MAC addresses for the switch. Various of filter options available.

|                    |                                                     |                                                      |                     |       |
|--------------------|-----------------------------------------------------|------------------------------------------------------|---------------------|-------|
| Syntax Description | mac-address                                         | Filter the table to a specific MAC address.          |                     |       |
|                    | if-number                                           | Filter the table to a specific interface.            |                     |       |
|                    | vlan                                                | Filter the table to a specific VLAN number (1-4094). |                     |       |
|                    | range                                               | Filter the table to a range of VLANs.                |                     |       |
|                    | unicast                                             | Filter the table to a unicast addresses only.        |                     |       |
|                    | multicast                                           | Filter the table to a multicast addresses only.      |                     |       |
| Default            | N/A                                                 |                                                      |                     |       |
| Configuration Mode | Any Command Mode                                    |                                                      |                     |       |
| History            | 3.1.0600                                            |                                                      |                     |       |
|                    | 3.3.4500                                            | Updated Example                                      |                     |       |
| Role               | admin                                               |                                                      |                     |       |
| Example            | switch (config) # show mac-address-table            |                                                      |                     |       |
|                    | Switch ethernet-default                             |                                                      |                     |       |
|                    | Vlan                                                | Mac Address                                          | Type      Interface |       |
|                    | ----                                                | -----                                                | ----                | ----- |
|                    | 1                                                   | 00:00:00:00:00:01                                    | Static              | Po5   |
| 1                  | 00:00:3D:5C:FE:16                                   | Dynamic                                              | Eth1/1              |       |
| 1                  | 00:00:3D:5D:FE:1B                                   | Dynamic                                              | Eth1/2              |       |
|                    | Number of unicast:                                  | 2                                                    |                     |       |
|                    | Number of multicast:                                | 0                                                    |                     |       |
|                    | switch (config) #                                   |                                                      |                     |       |
| Related Commands   | mac-address-table static<br>clear mac-address-table |                                                      |                     |       |
| Note               |                                                     |                                                      |                     |       |



## show mac-address-table aging-time

### show mac-address-table aging-time

Displays the MAC address table aging time.

|                           |                                                                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                               |
| <b>Default</b>            | N/A                                                                                                                                                                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                  |
| <b>History</b>            | 3.1.0600                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # mac-address-table aging-time 300 switch (config) # show mac-address-table aging-time</pre> <p>Mac Address Aging Time: 300</p> <pre>switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>mac-address-table aging-time mac-address-table static clear mac-address-table</pre>                                                                                          |
| <b>Note</b>               | MAC addresses learned on the mgmt0 is not shown by this command.                                                                                                                  |

## 5.6 Spanning Tree

The operation of Rapid Spanning Tree Protocol (RSTP) provides for rapid recovery of connectivity following the failure of a bridge/bridge port or a LAN. The RSTP component avoids this delay by calculating an alternate root port, and immediately switching over to the alternate port if the root port becomes unavailable. Thus, using RSTP, the switch immediately brings the alternate port to forwarding state, without the delays caused by the listening and learning states. The RSTP component conforms to IEEE standard 802.1D 2004.

RSTP enhancements is a set of functions added to increase the volume of RSTP in Mellanox switches. It adds a set of capabilities related to the behavior of ports in different segments of the network. For example: the required behavior of a port connected to a non-switch entity, such as host, is to converge quickly, while the required behavior of a port connected to a switch entity is to converge based on the RSTP parameters.

Additionally, it adds security issues on a port and switch basis, allowing the operator to determine the state and role of a port or the entire switch should an abnormal event occur. For example: If a port is configured to be root-guard, the operator will not allow it to become a root-port under any circumstances, regardless of any BPDUs that will have been received on the port.

### 5.6.1 Port Priority and Cost

When two ports on a switch are part of a loop, the STP port priority and port path cost configuration determine which port on the switch is put in the forwarding state and which port is put in the blocking state.

To configure port priority use the following command:

```
switch (config interface ethernet <inf>)# spanning-tree port-priority <0-240>
```

To configure port path cost use the following command:

```
switch (config interface ethernet <inf>)# spanning-tree cost <1-2000000000>
```

### 5.6.2 Port Type

Port type has the following configuration options:

- **edge** – is not assumed to be converged by the RSTP learning/forwarding mechanism. It converges to forwarding quickly.



It is recommended to configure the port type for all ports connected to hosts as edge ports.

- **normal** – is assumed to be connected to a switch, thus it tries to be converged by the RSTP learning/forwarding. However, if it does not receive any BPDUs, it is operationally moved to be edge.
- **network** – is assumed to be connected to a switch. If it does not receive any BPDUs, it is moved to discarding state.

Each of these configuration options is mutually exclusive.

Port type is configured using the command `spanning-tree port type`. It may be applied globally on the switch (Config) level, which configures all switch interfaces. Another option is to configure ports individually by entering the interface's configuration mode.

- Global configuration:

```
switch (config)# spanning-tree port type {edge , normal , network} default
```

- Interface configuration:

```
switch (config interface ethernet <inf>)# spanning-tree port type {edge , normal, network}
```

### 5.6.3 BPDU Filter

Using BPDU filter prevents the CPU from sending/receiving BPDUs on specific ports.

BPDU filtering is configured per interface. When configured, the port does not send any BPDUs and drops all BPDUs that it receives. To configure BPDU filter, use the following command:

```
switch (config interface ethernet <inf>)# spanning-tree bpdufilter {enable , disable}
```



Configuring BPDU filtering on a port connected to a switch can cause bridging loops because the port filters any BPDU it receives and goes to forwarding state.

### 5.6.4 BPDU Guard

BPDU guard is a security feature which, when enabled, shuts down the port in case it receives BPDU packets. This feature becomes useful when connecting to an unauthorized switch.

To configure BPDU guard use the following command:

```
switch (config interface ethernet <inf>)# spanning-tree port type <type> bpduguard
```

### 5.6.5 Loop Guard

Loop guard is a feature that prevents loops in the network.

When a blocking port in a redundant topology transitions to the forwarding state (accidentally), an STP loop occurs. This happens when BPDUs are no longer received by one of the ports in a physically redundant topology.

Loop guard is useful in switched networks where devices are connected point-to-point. A designated bridge cannot disappear unless it sends an inferior BPDU or brings the link down on a point-to-point connection.



The loop guard configuration is only allowed on “network” port type.

If loop guard is enabled and the port does not receive BPDUs, the port is put into an inconsistent state (blocking) until the port starts to receive BPDUs again. A port in the inconsistent state does not transmit BPDUs. If BPDUs are received again, loop guard alters its inconsistent state condition. STP converges to a stable topology without the failed link or bridge after loop guard isolates the failure.

Disabling loop guard moves all loop-inconsistent ports to listening state.

To configure loop guard use the following command:

```
switch (config interface ethernet <inf>)# spanning-tree guard loop
```

## 5.6.6 Root Guard

Configuring root guard on a port prevents that port from becoming a root port. A port put in root-inconsistent (blocked) state if an STP convergence is triggered by a BPDU that makes that port a root port. The port is unblocked after the port stops sending BPDUs.

To configure loop guard use the following command:

```
switch (config interface ethernet <inf>)# spanning-tree guard root
```

## 5.6.7 MSTP

Spanning Tree Protocol (STP) is a mandatory protocol to run on L2 Ethernet networks to eliminate network loops and the resulting broadcast storm caused by these loops. Multiple STP (MSTP) enables the virtualization of the L2 domain into several VLANs, each governed by a separate instance of a spanning tree which results in a network with higher utilization of physical links while still keeping the loop free topology on a logical level.

Up to 64 MSTP instances can be defined in the switch. Up to 64 VLANs can be mapped to a single MSTP instance. MSTP instance 0 (the default instance) may have all possible VLANs (1-4094) mapped to it.

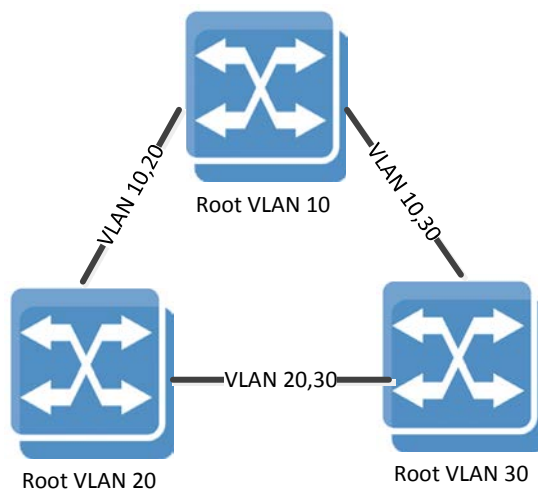
For MSTP network design over Mellanox L2 VMS, please refer to [Mellanox Virtual Modular Switch Reference Guide](#).

## 5.6.8 RPVST

Rapid Per-VLAN Spanning Tree (RPVST) flavor of the STP provides finer-grained traffic by paving a spanning-tree instance per each configured VLAN. Like MSTP, it allows a better utilization of the network links comparing to RSTP.

Figure 21 exhibits a typical RPVST network configuration to get a better utilization on the inter-switch trunk ports.

**Figure 21: RPVST Network Config**



### 5.6.8.1 RPVST and VLAN Limitations

When the STP of the switch is set to RPVST, spanning tree is set on each of the configured VLANs in the system by default. To enable the spanning tree mode, the command “spanning-tree” must be run.

Each VLAN runs an STP state machine and an RPVST instance. There is a global limitation on the number of active state machines that can operate in MLNX-OS. Enforcement of this limitation is done through the maximum number of VLANs allowed in the system. On x86 switch systems the limitation is 128 VLANs and on PPC systems it ranges from 13-18 VLANs depending on the switch system. The more ports the switch system has the less VLANs it can support.

**Table 51 - Supported VLANs by RPVST per Switch System**

| Switch System Model | Number of Supported VLANs |
|---------------------|---------------------------|
| x86 systems         | 128                       |
| SX1012              | 17                        |
| SX1016              | 13                        |
| SX1024              | 13                        |
| SX1035              | 13                        |
| SX1036              | 13                        |

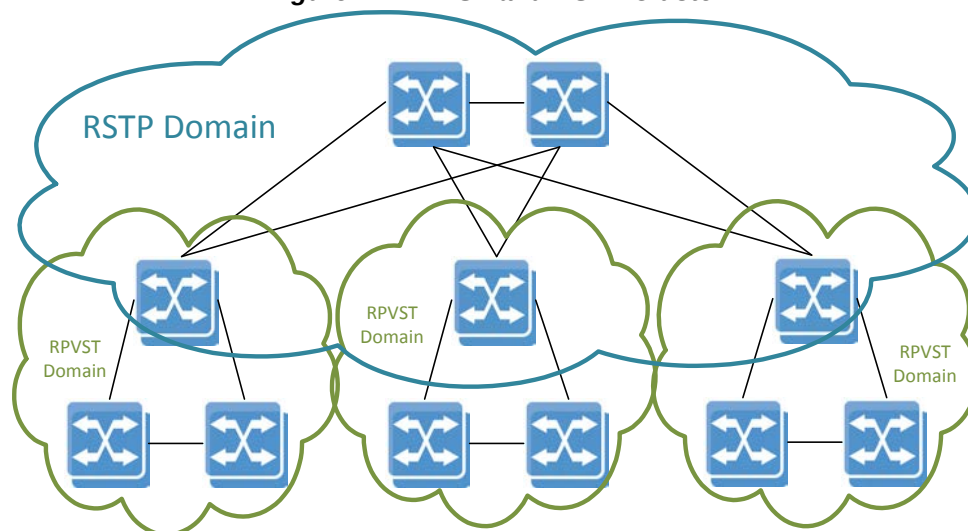
The state machine takes attributes like forward time, hello time, max age and priority, etc.



When configuring priority on a VLAN in RPVST, the operational priority given to the VLAN is a summation of what the user configured and the value of the VLAN itself. For example running “spanning-tree vlan 10 priority 32768” yields a priority of 32778 for VLAN 10.

### 5.6.8.2 RPVST and RSTP Interoperability

**Figure 22: RPVST and RSTP Cluster**



RPVST domains can be interconnected by a standard 802.1Q domain that runs RSTP protocol. While the RSTP domain builds a single common instance spanning tree, the RPVST domains at the edge continue to build a tree per VLAN while exchanging tagged RPVST multicast BPDUs.

(This exchange may happen on untagged RPVST BPDUs as well.) The switch devices that are in the boundary between the RPVST and the RSTP domains should be configured as RPVST mode.

When set to RPVST mode, the switch continues to run the common instance spanning tree (CIST) state machine on VLAN 1 by exchanging IEEE BPDUs with the legacy RSTP switches.

To successfully connect RSTP and RPVST domains, the system administrator must align the native VLAN configuration across all network switches, or in other words, the internal identification of untagged packets to VLAN.

## 5.6.9 Commands

### spanning-tree

**spanning-tree**  
**no spanning-tree**

Globally enables the spanning tree feature.  
The no form disables the spanning tree feature.

|                           |                                                         |
|---------------------------|---------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                     |
| <b>Default</b>            | Spanning tree is enabled.                               |
| <b>Configuration Mode</b> | Config                                                  |
| <b>History</b>            | 3.1.0000                                                |
| <b>Role</b>               | admin                                                   |
| <b>Example</b>            | switch (config) # no spanning-tree<br>switch (config) # |
| <b>Related Commands</b>   | show spanning-tree                                      |
| <b>Note</b>               |                                                         |

## spanning-tree mode

**spanning-tree mode {rst | mst | rpvst}**

**no spanning-tree mode**

Changes the spanning tree mode.

The no form of the command sets the parameter to its default value.

|                           |                                                                                                                                                                                                                  |                               |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | mst                                                                                                                                                                                                              | Multiple spanning tree.       |
|                           | rst                                                                                                                                                                                                              | Rapid spanning tree.          |
|                           | rpvst                                                                                                                                                                                                            | Rapid per-VLAN spanning tree. |
| <b>Default</b>            | rst                                                                                                                                                                                                              |                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                           |                               |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                         |                               |
| <b>Role</b>               | admin                                                                                                                                                                                                            |                               |
| <b>Example</b>            | switch (config)# spanning-tree mode mst                                                                                                                                                                          |                               |
| <b>Related Commands</b>   |                                                                                                                                                                                                                  |                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>On x86 switch systems, the number of VLANs supported by RPVST are 128</li> <li>On PPC switch systems, the number of VLANs supported by RPVST are between 13-18</li> </ul> |                               |



## spanning-tree (timers)

**spanning-tree** [**forward-time** <time in secs> | **hello-time** <time in secs> | **max-age** <time in secs>]

**no spanning-tree** [**forward-time** | **hello-time** | **max-age** | **priority**]

Sets the spanning tree timers.

The no form of the command sets the timer to default.

|                           |                                                                                                                                                      |                                                                                                                                                                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | forward-time                                                                                                                                         | Controls how fast a port changes its spanning tree state from Blocking state to Forwarding state.<br>Parameter range: 4-30 seconds.                                   |
|                           | hello-time                                                                                                                                           | Determines how often the switch broadcasts its hello message to other switches when it is the root of the spanning tree.<br>Parameter range: 1-2 seconds.             |
|                           | max-age                                                                                                                                              | Sets the maximum age allowed for the Spanning Tree Protocol information learnt from the network on any port before it is discarded.<br>Parameter range: 6-40 seconds. |
| <b>Default</b>            | forward-time: 15 seconds<br>hello-time: 2 seconds<br>max-age: 20 seconds                                                                             |                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                               |                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                             |                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                |                                                                                                                                                                       |
| <b>Example</b>            | switch (config) # spanning-tree forward-time<br>switch (config) #                                                                                    |                                                                                                                                                                       |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                   |                                                                                                                                                                       |
| <b>Note</b>               | The following formula applies on the spanning tree timers:<br>$2 * (\text{ForwardTime} - 1) \geq \text{MaxAgeTime} \geq 2 * (\text{Hello Time} + 1)$ |                                                                                                                                                                       |

## spanning-tree port type (default global)

**spanning-tree port type {edge [bpdufilter | bpduguard] | network [bpduguard] | normal [bpduguard]} default**  
**no spanning-tree port type default**

Configures all switch interfaces as edge/network/normal ports. These ports can be connected to any type of device.

The no form of the command disables the spanning tree operation.

|                           |                                                                                     |                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | edge                                                                                | Assumes all ports are connected to hosts/servers.                                           |
|                           | bpdufilter                                                                          | Configures to enable the spanning tree BPDU filter.                                         |
|                           | bpduguard                                                                           | Configures to enable the spanning tree BPDU guard.                                          |
|                           | network                                                                             | Assumes all ports are connected to switches and bridges.                                    |
|                           | normal                                                                              | The port type (edge or network) determines according to the spanning tree operational mode. |
| <b>Default</b>            | Normal                                                                              |                                                                                             |
| <b>Configuration Mode</b> | Config                                                                              |                                                                                             |
| <b>History</b>            | 3.1.0000                                                                            |                                                                                             |
|                           | 3.4.0008                                                                            | Updated command syntax                                                                      |
| <b>Role</b>               | admin                                                                               |                                                                                             |
| <b>Example</b>            | <pre>switch (config) # spanning-tree port type edge default switch (config) #</pre> |                                                                                             |
| <b>Related Commands</b>   | show spanning-tree                                                                  |                                                                                             |
| <b>Note</b>               |                                                                                     |                                                                                             |

## spanning-tree priority

**spanning-tree priority <bridge-priority>**

**no spanning-tree priority**

Sets the spanning tree bridge priority.

The no form of the command sets the bridge priority to default.

|                           |                                                                    |                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | bridge-priority                                                    | Sets the bridge priority for the spanning tree. Its value must be in steps of 4096, starting from 0. Only the following values are applicable: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, 61440. |
| <b>Default</b>            | 32786                                                              |                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                             |                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                           |                                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                              |                                                                                                                                                                                                                                                          |
| <b>Example</b>            | switch (config) # spanning-tree priority 4096<br>switch (config) # |                                                                                                                                                                                                                                                          |
| <b>Related Commands</b>   | show spanning-tree                                                 |                                                                                                                                                                                                                                                          |
| <b>Note</b>               |                                                                    |                                                                                                                                                                                                                                                          |

## spanning-tree port-priority

**spanning-tree port-priority <priority>**

**no spanning-tree port-priority**

Configures the spanning-tree interface priority.

The no form of the command returns configuration to its default.

|                           |                                                                                                                                                                 |                                                                                                                                  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | priority                                                                                                                                                        | Spanning tree interface priority. The possible values are: 0, 16, 32,48, 64, 80, 96, 112, 128,144, 160, 176, 192, 208, 224, 240. |
| <b>Default</b>            | 128                                                                                                                                                             |                                                                                                                                  |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                |                                                                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                        |                                                                                                                                  |
|                           | 3.3.4500                                                                                                                                                        | Added MLAG port-channel configuration mode                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                           |                                                                                                                                  |
| <b>Example</b>            | switch (config) # interface ethernet 1/1<br>switch (config interface ethernet 1/1) # spanning-tree port-priority 16<br>switch (config interface ethernet 1/1) # |                                                                                                                                  |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                              |                                                                                                                                  |
| <b>Note</b>               |                                                                                                                                                                 |                                                                                                                                  |

## spanning-tree cost

**spanning-tree cost <port cost>**

**no spanning-tree cost**

Configures the interface cost of the spanning tree.

The no form of the command returns configuration to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port cost                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sets the spanning tree cost of an interface.<br>Value range is 0-2000000000. |
| <b>Default</b>            | The default cost is derived from the speed.<br>1Gbps 20000<br>10Gbps 2000<br>40Gbps 500<br>56Gbps 357                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                              |
|                           | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Added MLAG port-channel configuration mode                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |
| <b>Example</b>            | <pre>switch (config) # interface ethernet 1/1 switch (config interface ethernet 1/1) # spanning-tree cost 1000 switch (config interface ethernet 1/1) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                              |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>LAG default cost is calculated by dividing the port speed by the number of active links in UP state. For example: if there were 4 links in the LAG out of which only two are in UP state, assuming the port speed is 10Gbps, the LAG cost will be <math>2000/2 = 1000</math>.</li> <li>When configuring the cost for a LAG, the cost will be fixed to this configuration, no matter what the number of active links (UIP state) in the LAG is</li> <li>Unstable network may cause the LAG cost to change dynamically assuming the cost parameter is not configured for anything else other than default</li> </ul> |                                                                              |

## spanning-tree port type

**spanning-tree port type <port type>**  
**no spanning-tree port type**

Configures spanning-tree port type  
 The no form of the command returns configuration to default.

|                           |                                                                                                                                                               |                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | default                                                                                                                                                       | According to global configuration                                                           |
|                           | edge                                                                                                                                                          | Assumes all ports are connected to hosts/servers.                                           |
|                           | normal                                                                                                                                                        | The port type (edge or network) determines according to the spanning tree operational mode. |
|                           | network                                                                                                                                                       | Assumes all ports are connected to switches and bridges.                                    |
|                           | bpdufilter                                                                                                                                                    | Configures to enable the spanning tree BPDU filter.                                         |
|                           | bpduguard                                                                                                                                                     | Configures to enable the spanning tree BPDU guard.                                          |
| <b>Default</b>            | Globally defined by the command “spanning-tree port type <port-type> default”                                                                                 |                                                                                             |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                              |                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                      |                                                                                             |
|                           | 3.3.4500                                                                                                                                                      | Added MLAG port-channel configuration mode                                                  |
| <b>Role</b>               | admin                                                                                                                                                         |                                                                                             |
| <b>Example</b>            | switch (config) # interface ethernet 1/1<br>switch (config interface ethernet 1/1) # spanning-tree port type edge<br>switch (config interface ethernet 1/1) # |                                                                                             |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                            |                                                                                             |
| <b>Note</b>               |                                                                                                                                                               |                                                                                             |

## spanning-tree guard

**spanning-tree guard {loop | root}**  
**no spanning-tree guard {loop | root}**

Configures spanning-tree guard.  
 The no form of the command returns configuration to default.

|                           |                                                                                                                                                           |                                                                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | loop                                                                                                                                                      | Enables loop-guard on the interface.<br>If the loop-guard is enabled, upon a situation where the interface fails to receive BPDUs the switch will not egress data traffic on this interface. |
|                           | root                                                                                                                                                      | Enables root-guard on the interface.<br>If root-guard is enabled on the interface, the interface will never be selected as root port.                                                        |
| <b>Default</b>            | loop-guard and loop-guard are disabled.                                                                                                                   |                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                          |                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                  |                                                                                                                                                                                              |
|                           | 3.3.4500                                                                                                                                                  | Added MLAG port-channel configuration mode                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                     |                                                                                                                                                                                              |
| <b>Example</b>            | switch (config) # interface ethernet 1/1<br>switch (config interface ethernet 1/1) # spanning-tree guard root<br>switch (config interface ethernet 1/1) # |                                                                                                                                                                                              |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                        |                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                           |                                                                                                                                                                                              |

## spanning-tree bpdudfilter

**spanning-tree bpdudfilter {disable | enable}**

**no spanning-tree bpdudfilter**

Configures spanning-tree BPDU filter on the interface. The interface will ignore any BPDU that it receives and will not send PDUs, The STP state on the port will move to the forwarding state.

The no form of the command returns the configuration to default.

|                           |                                                                                                                       |                                        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Syntax Description</b> | disable                                                                                                               | Disables the BPDU filter on this port. |
|                           | enable                                                                                                                | Enables the BPDU filter on this port.  |
| <b>Default</b>            | BPDU filter is disabled.                                                                                              |                                        |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                      |                                        |
| <b>History</b>            | 3.1.0000                                                                                                              |                                        |
| <b>Role</b>               | admin                                                                                                                 |                                        |
| <b>Example</b>            | switch (config) # interface ethernet 1/1<br>switch (config interface ethernet 1/1) # spanning-tree bpdudfilter enable |                                        |
| <b>Related Commands</b>   | show spanning-tree                                                                                                    |                                        |
| <b>Note</b>               | This command can be used when the switch is connected to hosts.                                                       |                                        |



## clear spanning-tree counters

### clear spanning-tree counters

Clears the spanning-tree counters.

|                           |                                                                    |
|---------------------------|--------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                |
| <b>Default</b>            | N/A                                                                |
| <b>Configuration Mode</b> | Config                                                             |
| <b>History</b>            | 3.1.0000                                                           |
| <b>Role</b>               | admin                                                              |
| <b>Example</b>            | switch (config) # clear panning-tree counters<br>switch (config) # |
| <b>Related Commands</b>   | show spanning tree                                                 |
| <b>Note</b>               |                                                                    |

## spanning-tree mst max-hops

**spanning-tree mst max-hops <max-hops>**

**no spanning-tree mst max-hops**

Specifies the max hop value inserts into BPDUs that sent out as the root bridge.  
The no form of the command sets the parameter to its default value.

|                           |                                                                                                                                                                                                                                               |                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Syntax Description</b> | max-hops                                                                                                                                                                                                                                      | Max hop value. The range is 6-40. |
| <b>Default</b>            | 20                                                                                                                                                                                                                                            |                                   |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                        |                                   |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                      |                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                         |                                   |
| <b>Example</b>            | <pre>switch (config)# spanning-tree mst max-hops 20 switch (config)#</pre>                                                                                                                                                                    |                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                               |                                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The max hop setting determines the number of bridges in an MST region that a BPDU can traverse before it is discarded</li> <li>This command is available when global STP mode is set to MST</li> </ul> |                                   |

## spanning-tree mst priority

**spanning-tree mst <mst-instance> priority <priority>**

**no spanning-tree mst <mst-instance> priority**

Configures the specified instance's priority number.

The no form of the command sets the parameter to its default value.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | mst-instance                                                                                                                                                                                                                                                                                                                                                                                                         | MST instance. Range is 1-64.                                                                                                                              |
|                    | priority                                                                                                                                                                                                                                                                                                                                                                                                             | MST instance port priority. Possible values are: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, 61440 |
| Default            | 32768                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                           |
| History            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                           |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |
| Example            | switch (config)# spanning-tree mst 1 priority 32768<br>switch (config)#                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                           |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
| Note               | <ul style="list-style-type: none"><li>The bridge priority is the four most significant digits of the bridge ID, which is used by spanning tree algorithms to select the root bridge and choose among redundant links. Bridge ID numbers range from 0-65535 (16 bits); bridges with smaller bridge IDs are elected over other bridges.</li><li>This command is available when global STP mode is set to MST</li></ul> |                                                                                                                                                           |

## spanning-tree mst vlan

**spanning-tree mst <mst-instance> vlan <vlan-range>**  
**no spanning-tree mst <mst-instance> vlan <vlan-range>**

Maps a VLAN or a range of VLANs into an MSTP instance.  
 The no form of the command unmaps a VLAN or a range of VLANs from MSTP instances.

|                           |                                                                     |                                                                                   |
|---------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | mst-instance                                                        | MST instance. Range is 1-64.                                                      |
|                           | vlan <vlan-range>                                                   | A single VLAN or a range of VLANs. The format is <vlan> or <from-vlan>-<to-vlan>. |
| <b>Default</b>            | N/A                                                                 |                                                                                   |
| <b>Configuration Mode</b> | Config                                                              |                                                                                   |
| <b>History</b>            | 3.3.4150                                                            |                                                                                   |
| <b>Role</b>               | admin                                                               |                                                                                   |
| <b>Example</b>            | switch (config)# spanning-tree mst 1 vlan 10-20<br>switch (config)# |                                                                                   |
| <b>Related Commands</b>   |                                                                     |                                                                                   |
| <b>Note</b>               | This command is available when global STP mode is set to MST        |                                                                                   |

## spanning-tree mst revision

**spanning-tree mst revision <number>**

**no spanning-tree mst revision**

Configures the MSTP revision number.

The no form of the command sets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                 |                                            |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Syntax Description</b> | number                                                                                                                                                                                                                                                          | The MST revision number. Range is 0-65535. |
| <b>Default</b>            | 0                                                                                                                                                                                                                                                               |                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                          |                                            |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                        |                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                           |                                            |
| <b>Example</b>            | <pre>switch (config)# spanning-tree mst revision 1 switch (config)#</pre>                                                                                                                                                                                       |                                            |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                 |                                            |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The revision number is one of three parameters, along with the MST name and VLAN-to-instance map, that identify the switch's MST region</li> <li>This command is available when global STP mode is set to MST</li> </ul> |                                            |

## spanning-tree mst name

**spanning-tree mst name <name>**

**no spanning-tree mst name**

Configures the MSTP name.

The no form of the command sets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                   |                                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | name                                                                                                                                                                                                                                                              | MST name: Up to 32 characters. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                               |                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                            |                                |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                          |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                             |                                |
| <b>Example</b>            | <pre>switch (config)# spanning-tree mst name my-mst switch (config)#</pre>                                                                                                                                                                                        |                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                   |                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The name is one of three parameters, along with the MST revision number and VLAN-to-instance map, that identifies the switch's MST region</li> <li>This command is available when global STP mode is set to MST</li> </ul> |                                |

## spanning-tree mst root

**spanning-tree mst <mst-instance> root <role>**

**no spanning-tree mst <mst-instance> root**

Changes the bridge priority for the specified MST instance to the following values:

- Primary – 8192
- Secondary – 16384

The no form of the command sets the parameter to its default value.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Syntax Description | mst-instance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MSTP instance. Possible range is 1-64. |
|                    | role                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Values: “primary” or “secondary”.      |
| Default            | primary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
| History            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
| Example            | switch (config)# spanning-tree mst name my-mst<br>switch (config)#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| Note               | <ul style="list-style-type: none"><li>• The root command is a way to automate a system configuration while ‘playing’ with the priority field. The priority field granularity may be too explicit for some users in case you wish to have 2 levels of priority (primary and secondary). So by default all the switches get the same priority and while using the root option you can get the role of master and backup by setting the priority field to a predefined value.</li><li>• This command is available when global STP mode is set to MST.</li></ul> |                                        |

## spanning-tree mst port-priority

**spanning-tree mst {mst-instance} port-priority <priority>**

**no spanning-tree mode**

Changes the spanning tree mode.

The no form of the command sets the parameter to its default value.

|                           |                                                                                                                                                                      |                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | mst-instance                                                                                                                                                         | MST instance. Range is 0-4094.                                                                                           |
|                           | priority                                                                                                                                                             | MST instance port priority. Valid values are: 0, 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224 and 240. |
| <b>Default</b>            | rst                                                                                                                                                                  |                                                                                                                          |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel                                                                                                           |                                                                                                                          |
| <b>History</b>            | 3.3.4150                                                                                                                                                             |                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                |                                                                                                                          |
| <b>Example</b>            | switch (config interface ethernet 1/1)# spanning-tree mst 1 port-priority 32768<br>switch (config interface port-channel 1)# spanning-tree mst 1 port-priority 32768 |                                                                                                                          |
| <b>Related Commands</b>   |                                                                                                                                                                      |                                                                                                                          |
| <b>Note</b>               | This command is available when global STP mode is set to MST.                                                                                                        |                                                                                                                          |



## spanning-tree mst cost

**spanning-tree mst {mst-instance} cost <cost-value>**  
**no spanning-tree mode**

Configures the cost per MSTP instance.  
 The no form of the command sets the parameter to its default value.

|                           |                                                                                                                                                                           |                                                |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | mst-instance                                                                                                                                                              | MST instance. Range is 1-64.                   |
|                           | cost-value                                                                                                                                                                | MST instance port cost. Range is 0-2000000000. |
| <b>Default</b>            | 2000 for 10Gb/s, 500 for 40Gb/s, 20000 for 1Gb/s, 357 for 56Gb/s                                                                                                          |                                                |
| <b>Configuration Mode</b> | Config Interface Port Channel                                                                                                                                             |                                                |
| <b>History</b>            | 3.3.4150                                                                                                                                                                  |                                                |
| <b>Role</b>               | admin                                                                                                                                                                     |                                                |
| <b>Example</b>            | <pre>switch (config interface ethernet 1/1)# spanning-tree mst 1 cost 4000 switch (config interface port-channel 1)# spanning-tree mst 1 cost 4000 switch (config)#</pre> |                                                |
| <b>Related Commands</b>   |                                                                                                                                                                           |                                                |
| <b>Note</b>               | This command is available when global STP mode is set to MST.                                                                                                             |                                                |

## spanning-tree vlan forward-time

**spanning-tree vlan <vid> forward-time <secs>**

**no spanning-tree vlan <vid> forward-time**

Configures how fast an interface changes its spanning tree state from Blocking to Forwarding.

The no form of the command resets the parameter value to its default.

|                           |                                                                                                                                                                                                                                                                                              |                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | secs                                                                                                                                                                                                                                                                                         | Parameter range: 4-30 seconds. |
| <b>Default</b>            | 15 seconds                                                                                                                                                                                                                                                                                   |                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                       |                                |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                     |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                        |                                |
| <b>Example</b>            | switch (config) # spanning-tree vlan 10 forward-time 15                                                                                                                                                                                                                                      |                                |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                                                                                                                                                           |                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The following formula applies on the spanning tree timers:<br/> <math>2 * (\text{ForwardTime} - 1) \geq \text{MaxAgeTime} \geq 2 * (\text{Hello Time} + 1)</math> </li> <li>This command is available when global STP mode is set to RPVST</li> </ul> |                                |

## spanning-tree vlan hello-time

**spanning-tree vlan <vid> hello-time <secs>**

**no spanning-tree vlan <vid> hello-time**

Configures how often the switch broadcasts its hello message to other switches when it is the root of the spanning tree.

The no form of the command resets the parameter value to its default.

|                           |                                                                                                                                                                                                                                                                                              |                               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | secs                                                                                                                                                                                                                                                                                         | Parameter range: 1-2 seconds. |
| <b>Default</b>            | 2 seconds                                                                                                                                                                                                                                                                                    |                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                       |                               |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                     |                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                        |                               |
| <b>Example</b>            | switch (config) # spanning-tree vlan 10 hello-time 2                                                                                                                                                                                                                                         |                               |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                                                                                                                                                           |                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The following formula applies on the spanning tree timers:<br/> <math>2 * (\text{ForwardTime} - 1) \geq \text{MaxAgeTime} \geq 2 * (\text{Hello Time} + 1)</math> </li> <li>This command is available when global STP mode is set to RPVST</li> </ul> |                               |

## spanning-tree vlan max-age

**spanning-tree vlan <vid> max-age <secs>**

**no spanning-tree vlan <vid> max-age**

Sets the maximum age allowed for the Spanning Tree Protocol information learned from the network on any port before it is discarded.

The no form of the command resets the parameter value to its default.

|                           |                                                                                                                                                                                                                                                                                              |                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | secs                                                                                                                                                                                                                                                                                         | Parameter range: 6-40 seconds. |
| <b>Default</b>            | 20 seconds                                                                                                                                                                                                                                                                                   |                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                       |                                |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                     |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                        |                                |
| <b>Example</b>            | switch (config) # spanning-tree vlan 10 max-age 20                                                                                                                                                                                                                                           |                                |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                                                                                                                                                           |                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The following formula applies on the spanning tree timers:<br/> <math>2 * (\text{ForwardTime} - 1) \geq \text{MaxAgeTime} \geq 2 * (\text{Hello Time} + 1)</math> </li> <li>This command is available when global STP mode is set to RPVST</li> </ul> |                                |

## spanning-tree vlan priority

**spanning-tree vlan <vid> priority <priority>**

**no spanning-tree vlan <vid> priority**

Configures RPVST instance port priority.

The no form of the command resets the parameter value to its default.

|                           |                                                                                                                                                                                                                                                                                              |                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | priority                                                                                                                                                                                                                                                                                     | Possible values are: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, 61440. |
| <b>Default</b>            | 32768                                                                                                                                                                                                                                                                                        |                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                       |                                                                                                                                |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                     |                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                        |                                                                                                                                |
| <b>Example</b>            | switch (config) # spanning-tree vlan 10 priority 32768                                                                                                                                                                                                                                       |                                                                                                                                |
| <b>Related Commands</b>   | show spanning-tree                                                                                                                                                                                                                                                                           |                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The following formula applies on the spanning tree timers:<br/> <math>2 * (\text{ForwardTime} - 1) \geq \text{MaxAgeTime} \geq 2 * (\text{Hello Time} + 1)</math> </li> <li>This command is available when global STP mode is set to RPVST</li> </ul> |                                                                                                                                |

## show spanning-tree

### show spanning-tree

Displays spanning tree information.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.0000<br>3.4.1100 Updated Example with R and G flags                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre> switch (config) # show spanning-tree  Switch ethernet-default  Spanning tree protocol is enabled rst  Spanning tree force version:2 Root ID     Priority 32768     Address 00:02:c9:7a:e9:40     Cost 1000     Port Eth1/32     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Bridge ID     Priority 32768     Address 00:02:c9:96:c6:d0     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  L - Loop Inconsistent R - Root Inconsistent G - BPDU Guard Inconsistent  Interface      Role      Sts      Cost      Prio      Type ----- Eth1/9         Designated Forwarding  500       128       normal Eth1/22        Designated Discarding(R) 500       128       normal Eth1/32        Root      Forwarding  500       128       normal Eth1/39        Disabled  Discarding(G) 2000      128       normal switch (config) # </pre> |
| <b>Related Commands</b>   | <pre> clear spanning-tree counters spanning-tree </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## show spanning-tree detail

### show spanning-tree detail

Displays detailed spanning-tree configuration and statistics.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # show spanning-tree detail  Switch ethernet-default Spanning tree protocol is enabled Bridge is executing the rst compatible Spanning Tree Protocol Bridge Identifier has priority 32768, address 00:02:c9:96:c6:d0   Configured hello time 2, max age 20, forward delay 15   Current root has priority 32768, address 00:02:c9:7a:e9:40   Root port is Eth1/32( Ethernet1/32),cost of root path is 1000   Number of topology changes 21,last change occurred 00:00:03 ago   Timers: hold 6 hello 2, max age 20, forward delay 15   default port type: normal, default bpdu filter: disabled,   default bpdu guard: disabled switch (config) #</pre> |
| <b>Related Commands</b>   | <pre>clear spanning-tree counters spanning-tree</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## show spanning-tree interface

**show spanning-tree interface {ethernet <slot>/<port> | port-channel <port-channel> | mlag-port-channel <mlag-port-channel>}**

Display running state for specific interfaces.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | ethernet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ethernet interface. |
|                           | port-channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | LAG instance.       |
|                           | mlag-port-channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MLAG instance.      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| <b>Example</b>            | <pre>switch (config) # show spanning-tree interface ethernet 1/2 Eth1/2 is Disabled Discarding   Port path cost 500, Port priority 128, Port Identifier 128.5   Designated root has priority 0, address unknown   Designated bridge has priority 0, address unknown   Designated port id 0.0, designated path cost 0   Number of transitions to forwarding state: 0   Port type: normal   PortFast is: off   Bpdu filter: disabled   Bpdu guard: disabled   Loop guard: disabled   Root guard: disabled   Link type: point-to-point   BPDU: sent: 0   received: 0 switch (config) #</pre> |                     |
| <b>Related Commands</b>   | <pre>clear spanning-tree counters spanning-tree</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |



## show spanning-tree mst

**show spanning-tree mst [details | <instance> interface {ethernet <slot>/<port> | port-channel <port-channel> | mlag-port-channel <mlag-port-channel>}]**

Displays basic multi-spanning-tree information.

|                    |                                                    |                                                                     |            |      |        |                |
|--------------------|----------------------------------------------------|---------------------------------------------------------------------|------------|------|--------|----------------|
| Syntax Description | details                                            | Displays detailed multi-spanning-tree configuration and statistics. |            |      |        |                |
|                    | ethernet                                           | Ethernet interface.                                                 |            |      |        |                |
|                    | port-channel                                       | LAG instance.                                                       |            |      |        |                |
|                    | mlag-port-channel                                  | MLAG instance.                                                      |            |      |        |                |
| Default            | N/A                                                |                                                                     |            |      |        |                |
| Configuration Mode | Any Command Mode                                   |                                                                     |            |      |        |                |
| History            | 3.3.4150                                           |                                                                     |            |      |        |                |
| Role               | admin                                              |                                                                     |            |      |        |                |
| Example            | switch (config) # show spanning-tree mst           |                                                                     |            |      |        |                |
|                    | MST0                                               |                                                                     |            |      |        |                |
|                    | vlans mapped: 1-1023,1025-2047,2049-3071,3073-4094 |                                                                     |            |      |        |                |
|                    | Interface                                          | Role                                                                | Sts        | Cost | Prio   | Type           |
|                    | ----                                               | ----                                                                | -----      | ---- | ----   | ----           |
|                    | Eth1/9                                             | Designated                                                          | Forwarding | 500  | 128.9  | point-to-point |
|                    | Eth1/10                                            | Designated                                                          | Forwarding | 500  | 128.10 | point-to-point |
|                    | Eth1/11                                            | Back Up                                                             | Discarding | 500  | 128.22 | point-to-point |
| Related Commands   | switch (config) #                                  |                                                                     |            |      |        |                |
|                    | clear spanning-tree counters                       |                                                                     |            |      |        |                |
|                    | spanning-tree                                      |                                                                     |            |      |        |                |
| Note               |                                                    |                                                                     |            |      |        |                |

## show spanning-tree root

### show spanning-tree root

Displays root multi-spanning-tree information.

| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|------------|---------|---------|-----------|--|----------|----------|----------|-----------|------------|---------|---------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------------------|-----|---|----|----|---------|------|-------|-------------------|---|---|----|----|---|------|---|-------------------|---|---|----|----|---|------|-------|-------------------|---|---|----|----|---|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| History            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| Example            | <div>switch (config) # show spanning-tree root</div> <table><thead><tr><th>Instance</th><th>Priority</th><th>MAC addr</th><th>Root Cost</th><th>Hello Time</th><th>Max Age</th><th>FWD Dly</th><th>Root Port</th></tr><tr><th>-----</th><th>-----</th><th>-----</th><th>-----</th><th>-----</th><th>-----</th><th>-----</th><th>-----</th></tr></thead><tbody><tr><td>MST0</td><td>32768</td><td>00:02:c9:71:ed:40</td><td>500</td><td>2</td><td>20</td><td>15</td><td>Eth1/20</td></tr><tr><td>MST1</td><td>32768</td><td>00:02:c9:71:f0:c0</td><td>0</td><td>2</td><td>20</td><td>15</td><td>-</td></tr><tr><td>MST2</td><td>0</td><td>00:02:c9:71:f0:c0</td><td>0</td><td>2</td><td>20</td><td>15</td><td>-</td></tr><tr><td>MST3</td><td>32768</td><td>00:02:c9:71:f0:c0</td><td>0</td><td>2</td><td>20</td><td>15</td><td>-</td></tr></tbody></table> <div>switch (config) #</div> |                   |           |            |         |         |           |  | Instance | Priority | MAC addr | Root Cost | Hello Time | Max Age | FWD Dly | Root Port | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | MST0 | 32768 | 00:02:c9:71:ed:40 | 500 | 2 | 20 | 15 | Eth1/20 | MST1 | 32768 | 00:02:c9:71:f0:c0 | 0 | 2 | 20 | 15 | - | MST2 | 0 | 00:02:c9:71:f0:c0 | 0 | 2 | 20 | 15 | - | MST3 | 32768 | 00:02:c9:71:f0:c0 | 0 | 2 | 20 | 15 | - |
| Instance           | Priority                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MAC addr          | Root Cost | Hello Time | Max Age | FWD Dly | Root Port |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| -----              | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -----             | -----     | -----      | -----   | -----   | -----     |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| MST0               | 32768                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 00:02:c9:71:ed:40 | 500       | 2          | 20      | 15      | Eth1/20   |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| MST1               | 32768                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 00:02:c9:71:f0:c0 | 0         | 2          | 20      | 15      | -         |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| MST2               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 00:02:c9:71:f0:c0 | 0         | 2          | 20      | 15      | -         |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| MST3               | 32768                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 00:02:c9:71:f0:c0 | 0         | 2          | 20      | 15      | -         |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| Related Commands   | <div>clear spanning-tree counters</div> <div>spanning-tree</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |           |            |         |         |           |  |          |          |          |           |            |         |         |           |       |       |       |       |       |       |       |       |      |       |                   |     |   |    |    |         |      |       |                   |   |   |    |    |   |      |   |                   |   |   |    |    |   |      |       |                   |   |   |    |    |   |

## show spanning-tree vlan

**show spanning-tree vlan <vid> [detail | interface {ethernet <slot>/<port> | port-channel <port-channel> | mlag-port-channel <mlag-port-channel>}]**

Displays spanning tree information.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | vid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | VLAN ID. Range is also supported.<br>Format: <vid1>[-<vid2>] |
|                           | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Displays detailed RPVST configuration and statistics.        |
|                           | ethernet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ethernet interface.                                          |
|                           | port-channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LAG instance.                                                |
|                           | mlag-port-channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | MLAG instance.                                               |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                              |
| <b>Example</b>            | <pre> switch (config) # show spanning-tree vlan 10  Switch ethernet-default  Spanning tree protocol is enabled rpvst  Spanning tree force version:2  Vlan 10 Root ID     Priority 10     Address 00:02:c9:96:c6:d0     This bridge is the root     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec Bridge ID     Priority 10     Address 00:02:c9:96:c6:d0     Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec  L - Loop Inconsistent  Interface      Role      Sts      Cost      Prio      Type ----- Mpo21          Designated Forwarding 500        128       normal Mpo20          Back Up   Discarding 500        128       normal switch (config) # </pre> |                                                              |
| <b>Related Commands</b>   | <pre> clear spanning-tree counters spanning-tree </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |

## 5.7 OpenFlow

MLNX-OS supports OpenFlow 1.0. OpenFlow is a network protocol that facilitates direct communication between network systems via Ethernet. Software Defined Networks (SDN) allows a centralist management of network equipment. OpenFlow allows the SDN controller to manage SDN equipment. The OpenFlow protocol allows communication between the OpenFlow controller and OpenFlow agent.

OpenFlow is useful to manage switches and allow applications running on the OpenFlow controller to have access to the switch's datapath and provide functionality such as flow steering, security enhancement, traffic monitoring and more.

The OpenFlow controller communicates with the OpenFlow switch over secured channel using OpenFlow protocol.

An OpenFlow switch contains a flow table which contains flows inserted by the OpenFlow controller. And the OpenFlow switch performs packet lookup and forwarding according to those rules.

Mellanox OpenFlow switch implementation is based on the hybrid model, allowing the coexistence of an OpenFlow pipeline and a normal pipeline. In this model, a packet is forwarded according to OpenFlow configuration, if such configuration is matched with the packet parameters. Otherwise, the packet is handled by the normal (regular forwarding/routing) pipeline.

The OpenFlow specification defines:

“OpenFlow-hybrid switches support both OpenFlow operation and normal Ethernet switching operation, i.e. traditional L2 Ethernet switching, VLAN isolation, L3 routing (IPv4 routing, IPv6 routing...), ACL and QoS processing. Those switches must provide a classification mechanism outside of OpenFlow that routes traffic to either the OpenFlow pipeline or the normal pipeline. For example, a switch may use the VLAN tag or input port of the packet to decide whether to process the packet using one pipeline or the other, or it may direct all packets to the OpenFlow pipeline.”

Utilizing the built-in capabilities of the hybrid switch/router is the main benefit of the hybrid mode. It increases network performance and efficiency – faster processing of new flows as well as lower load on the controllers. The hybrid switch processes non-OpenFlow data through its local management plane and achieve better efficiency and use of resources, compared to the pure OpenFlow switch.

### 5.7.1 Flow Table

The flow table contains flows which are used to perform packet lookup, modification and forwarding. Each flow has a 12 tuple key. The key is used in order to classify a packet into a certain flow. The key contains the flowing fields: ingress port, source MAC, destination MAC, Ether-Type, VLAN ID, PCP, source IP, destination IP, IP protocol, IP ToS bits, TCP/UDP source port and TCP/UDP destination port.

The flow key can have a specific value for each field or wildcard which signals to the switch to ignore this part of the key.

Each packet passes through the flow table once a match is found; the switch performs the actions configured to the specific flow by the OpenFlow controller.

Upkeeping a flow table enables the switch to forward incoming traffic with a simple lookup on its flow table entries. OpenFlow switches perform a check for matching entries on, or ignore using a wildcard, specific fields of the ingress traffic. If the entry exists, the switch performs the action associated with that flow entry. Packets without a flow entry match are forwarded according to the normal pipeline (hybrid switch).

Every flow entry contains one of the following parameters:

1. Header fields for matching purposes with each entry containing a specific value or a wildcard which could match all entries.
2. Matching packet counters which are useful for statistical purposes, in order to keep track of the number of packets.
3. Actions which specify the manner in which to handle the packets of a flow which can be any of the following:
  - a. Forwarding the packet
  - b. Dropping the packet
  - c. Forwarding the packet to the OpenFlow controller
  - d. Modifying the VLAN, VLAN priority (PCP), and/or stripping the VLAN header



The flow table supports up to 1000 flows.

## 5.7.2 Configuring OpenFlow

### ➤ *To run OpenFlow on a switch:*

**Step 1.** Unlock the OpenFlow CLI commands. Run:

```
switch (config) # protocol openflow
```

**Step 2.** Configure interfaces to be managed by OpenFlow. Run:

```
switch (config) # interface ethernet 1/1-1/4 openflow mode hybrid
```

**Step 3.** Configure the OpenFlow controller IP and TCP port. Run:

```
switch (config) # openflow controller-ip 10.209.0.205 tcp-port 6633
```

**Step 4.** (Optional) Verify the OpenFlow configuration. Run:

```
switch (config) # show openflow
OpenFlow version: OF VERSION 1.0
Table size: 1000, 0 in use
Active controller ip: 10.209.0.205 port: 6633
Connection status: HANDSHAKE_COMPLETE (CONNECTED)
Forward-to-controller: ospf lldp arp-unicast arp-broadcast (all)
Enabled ports: Eth1/1 Eth1/2 Eth1/3 Eth1/4
switch (config) #
```



To be able to configure the switch using the controller, you should see the following line in the output:

Connection status must be: HANDSHAKE\_COMPLETE (CONNECTED).

## 5.7.3 Commands

### protocol openflow

**protocol openflow**  
**no protocol openflow**

Unhides the OpenFlow commands.  
The no form of the command hides the OpenFlow commands.

|                           |                                                          |
|---------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                      |
| <b>Default</b>            | no protocol openflow                                     |
| <b>Configuration Mode</b> | Config                                                   |
| <b>History</b>            | 3.3.4200                                                 |
| <b>Role</b>               | admin                                                    |
| <b>Example</b>            | switch (config) # protocol openflow<br>switch (config) # |
| <b>Related Commands</b>   |                                                          |
| <b>Note</b>               |                                                          |

## openflow description

**openflow description** <string>

Sets the OpenFlow description.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Syntax Description</b> | string                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Free string. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |
| <b>History</b>            | 3.3.4302                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |
| <b>Example</b>            | <pre> switch (config) # openflow description OF-switch-104 switch (config) # show openflow detail OpenFlow version: OF VERSION 1.0 Table size: 1000, 0 in use Active controller ip: 10.209.1.39 port: 6633 Connection status: HANDSHAKE_COMPLETE (CONNECTED) Forward-to-controller: ospf lldp arp-unicast arp-broadcast (all) Enabled ports: Eth1/10 Eth1/11 Eth1/13 Eth1/19 Echo period: 10 sec Keep alive period: 30 sec Messages in (last session): 86290 Messages out (last session): 47984 Disconnect count: 0 Openflow description: OF-switch-104 Datapath ID: 00:00:00:02:c9:a8:e3:50 Not supporting buffering Not supporting emergency flows Not supporting port statistics Not supporting IP reassemble Supporting spanning tree Not supporting queue statistics switch (config) # </pre> |              |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |

## openflow mode hybrid

**openflow mode hybrid**  
**no openflow mode**

Enables OpenFlow on the port.  
The no form of the command returns the port to its default state.

|                           |                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                     |
| <b>Default</b>            | no openflow mode                                                                                        |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                               |
| <b>History</b>            | 3.3.4200                                                                                                |
| <b>Role</b>               | admin                                                                                                   |
| <b>Example</b>            | switch (config interface ethernet 1/1)# openflow mode hybrid<br>switch (config interface ethernet 1/1)# |
| <b>Related Commands</b>   |                                                                                                         |
| <b>Note</b>               |                                                                                                         |



## controller-ip

**controller-ip <ip-address> [tcp-port <port-number>]**

**no controller-ip <ip-address> tcp-port**

Sets the OpenFlow controller's IP & TCP port.

The no form of the command sets the parameter to its default.

|                           |                                                                                                  |                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                       | The IPv4 address of the OpenFlow controller.         |
|                           | tcp-port <port-number>                                                                           | Sets the TCP port number of the OpenFlow controller. |
| <b>Default</b>            | 0.0.0.0; TCP port 6633                                                                           |                                                      |
| <b>Configuration Mode</b> | Config OpenFlow                                                                                  |                                                      |
| <b>History</b>            | 3.3.4200                                                                                         |                                                      |
| <b>Role</b>               | admin                                                                                            |                                                      |
| <b>Example</b>            | switch (config openflow) # controller-ip 10.10.10.10 tcp-port 6633<br>switch (config openflow) # |                                                      |
| <b>Related Commands</b>   |                                                                                                  |                                                      |
| <b>Note</b>               |                                                                                                  |                                                      |

## datapath-id

**datapath-id <value>**

**no datapath-id**

Sets a specific identifier for the switch with which the controller is communicating. The no form of the command resets the parameter to its default value.

|                           |                                                                             |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | value                                                                       | The most significant 16 bits of the agent data-path ID. Range is 0x0000-0xFFFF in hexa. |
| <b>Default</b>            | 0x0000                                                                      |                                                                                         |
| <b>Configuration Mode</b> | Config OpenFlow                                                             |                                                                                         |
| <b>History</b>            | 3.3.4200                                                                    |                                                                                         |
| <b>Role</b>               | admin                                                                       |                                                                                         |
| <b>Example</b>            | switch (config openflow) # datapath-id 0x1234<br>switch (config openflow) # |                                                                                         |
| <b>Related Commands</b>   |                                                                             |                                                                                         |
| <b>Note</b>               |                                                                             |                                                                                         |

## forward-to-controller

**forward-to-controller** {[ospf] [lldp] [arp-unicast] [arp-broadcast] all | none}

Forwards the selected traffic types to the controller from all the ports on which OpenFlow enabled.

|                           |                                                                                            |                                                   |
|---------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Syntax Description</b> | ospf                                                                                       | Forwards OSPF traffic to the controller.          |
|                           | lldp                                                                                       | Forwards LLDP traffic to the controller.          |
|                           | arp-unicast                                                                                | Forwards ARP-unicast traffic to the controller.   |
|                           | arp-broadcast                                                                              | Forwards ARP-broadcast traffic to the controller. |
|                           | all                                                                                        | Forwards all traffic types to the controller.     |
|                           | none                                                                                       | Forwards no traffic to the controller.            |
| <b>Default</b>            | None                                                                                       |                                                   |
| <b>Configuration Mode</b> | Config OpenFlow                                                                            |                                                   |
| <b>History</b>            | 3.3.4200                                                                                   |                                                   |
| <b>Role</b>               | admin                                                                                      |                                                   |
| <b>Example</b>            | <pre>switch (config openflow) # forward-to-controller all switch (config openflow) #</pre> |                                                   |
| <b>Related Commands</b>   |                                                                                            |                                                   |
| <b>Note</b>               |                                                                                            |                                                   |

## show openflow

### show openflow [detail | tables | flows <id>]

Displays general information about the OpenFlow protocol configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays detailed information about the OpenFlow protocol.                         |
|                           | tables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays information about the OpenFlow tables (size, type, etc.).                 |
|                           | flows <id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Displays specific flows inside the OpenFlow tables. ID may be a range (e.g. 1-10). |
|                           | statistics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Displays OpenFlow statistics.                                                      |
| <b>Default</b>            | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                    |
| <b>History</b>            | 3.3.4200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                    |
|                           | 3.3.4302                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Removed flow-id parameter<br>Added “flows” and “statistics” parameters             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                    |
| <b>Example</b>            | switch (config openflow) # show openflow flows 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                    |
|                           | <pre> Flow id: 2 priority:      1 hard timeout:  infinite idle timeout:  0 sec match:   ingress interface:      Eth1/18   source Ethernet address: 11:22:33:44:55:66   destination Ethernet address: 77:88:aa:bb:cc:fe   Ethernet type:          0x800   VLAN ID:                308   PCP:                    4   SIP:                    1.1.1.1   DIP:                    2.2.2.2   Dport:                  1790   Protocol:               86   TOS:                    120 actions:   output controller statistics:   0 packets,  0 bytes </pre> |                                                                                    |
|                           | switch (config openflow) #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                    |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                    |

## 5.8 IGMP Snooping



Only IGMP Snooping v1 and v2 are supported.

The Internet Group Multicast Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships. The host joins a multicast-group by sending a join request message towards the network router, and responds to queries sent from the network router by dispatching a join report.

A given port can be either manually configured to be a router-port or it can be dynamically manifested when having received a query, hence, the network router is connected to this port. All IGMP Snooping Control packets received from hosts (joins/leaves) are forwarded to the router-port, and the router-port updates its multicast-group data-base accordingly. Each dynamically learnt multicast group will be added to all of the router-ports on the switch.

As many as 5K multicast groups can be created on the switch.

### 5.8.1 Configuring IGMP Snooping

You can configure IGMP snooping to establish multicast group memberships.

➤ **To configure IGMP snooping:**

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Enable IGMP snooping globally. Run:

```
switch (config) # ip igmp snooping
switch (config) #
```

**Step 4.** Enable IGMP snooping on a VLAN. Run:

```
switch (config) # vlan 2
switch (config vlan 2) # ip igmp snooping
```

### 5.8.2 Defining a Multicast Router Port on a VLAN

You can define a Multicast Router (MRouter) port on a VLAN in one of the following methods:

➤ **To change the interface switchport to trunk:**

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Enable IGMP snooping globally. Run:

```
switch (config) # ip igmp snooping
switch (config) #
```

- Step 4.** Change the interface switchport mode of the port (the interface is member of VLAN 1 by default). Run:

```
switch (config) # interface ethernet 1/1
switch (config interface ethernet 1/1) # switchport mode trunk
```

- Step 5.** Change back to config mode. Run:

```
switch (config interface ethernet 1/1) # exit
switch (config) #
```

- Step 6.** Define the MRouter port on the VLAN. Run:

```
switch (config) # vlan 2
switch (config vlan 2) # ip igmp snooping mrouter interface ethernet 1/1
switch (config vlan 2) #
```

➤ **To change the interface switchport to hybrid:**

- Step 1.** Log in as admin.

- Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

- Step 3.** Enable IGMP snooping globally. Run:

```
switch (config) # ip igmp snooping
switch (config) #
```

- Step 4.** Create a VLAN. Run:

```
switch (config) # vlan 200
switch (config vlan 200) #
```

- Step 5.** Change back to config mode. Run:

```
switch (config vlan 200) # exit
switch (config) #
```

- Step 6.** Change the interface switchport mode of the port (the interface is member of VLAN 1 by default). Run:

```
switch (config) # interface ethernet 1/36
switch (config interface ethernet 1/36) # switchport mode hybrid
```

- Step 7.** Attach the VLAN to the port's interface. Run:

```
switch (config interface ethernet 1/36) # switchport mode hybrid allowed-vlan 200
switch (config interface ethernet 1/36) #
```

- Step 8.** Change to config mode again. Run:

```
switch (config interface ethernet 1/36) # exit
switch (config) #
```

- Step 9.** Define the MRouter port on the VLAN. Run:

```
switch (config) # vlan 200
switch (config vlan 200) # ip igmp mrouter interface ethernet 1/36
switch (config vlan 200) #
```

### 5.8.3 IGMP Snooping Querier

IGMP Snooping Querier compliments the IGMP snooping functionality. IGMP Snooping Querier is used to support IGMP snooping in a VLAN where PIM and IGMP are not configured because the multicast traffic does not need to be routed. When IGMP Snooping Querier is enabled, IGMP queries are sent out periodically by the switch through all ports in the VLAN and to which hosts wishing to receive IP multicast traffic respond with IGMP report messages. IGMP Snooping Querier must be used in conjunction with IGMP snooping as IGMP snooping listens to these IGMP reports to establish appropriate forwarding.

➤ **To configure IGMP Snooping Querier:**

**Step 1.** Enable the IGMP snooping on the switch. Run:

```
switch (config) # ip igmp snooping
```

**Step 2.** Enable the IGMP snooping querier on a specific VLAN. Run:

```
switch (config) # vlan 10
switch (config vlan 10)# ip igmp snooping querier
```

**Step 3.** Set the query interval time. Run:

```
switch (config vlan 10)# igmp snooping querier query-interval 25
```

**Step 4.** (Optional) Verify the IGMP snooping querier configuration. Run:

```
switch (config vlan 10)# show ip igmp snooping querier
VLAN 10 IGMP Querier Present query-interval: 125 address: 1.1.1.2 version: 2
switch (config vlan 10)#
```

## 5.8.4 Commands

### ip igmp snooping (admin)

**ip igmp snooping**  
**no ip igmp snooping**

Enables IGMP snooping globally or per VLAN.  
 The no form of the command disables IGMP snooping globally or per VLAN.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>            | IGMP snooping is disabled, globally and per VLAN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config<br>Config VLAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # ip igmp snooping switch (config) # vlan 10 switch (config vlan 10) # ip igmp snooping switch (config vlan 10) # exit switch (config) # show ip igmp snooping</pre> <p>IGMP snooping global configuration:</p> <pre>IGMP snooping globally enabled IGMP snooping operationally enabled Proxy-reporting globally disabled Last member query interval is 1 seconds Mrouter timeout is 125 seconds Port purge timeout is 260 seconds Report suppression interval is 5 seconds</pre> <pre>switch (config vlan 10) # show ip igmp snooping vlan 10</pre> <p>Vlan 10 configuration parameters:</p> <pre>IGMP snooping is enabled IGMP version is V2 Snooping switch is acting as Non-Querier mrouter static port list: none mrouter dynamic port list: none switch (config vlan 10) # vlan 10 switch (config vlan 10) #</pre> |
| <b>Related Commands</b>   | show ip igmp snooping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               | IGMP snooping has global admin state, and per VLAN admin state. Both states need to be enabled in order to enable the IGMP snooping on a specific VLAN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



## ip igmp snooping (config)

**ip igmp snooping {last-member-query-interval <1-25> | proxy reporting mrouter-timeout <60-600> | port-purge-timeout <130-1225> | report-suppression-interval <1-25>}**

**no ip igmp snooping {last-member-query-interval | proxy reporting | mrouter-timeout | report-suppression-interval}**

Configures IGMP global parameters.

The no form of the command resets the IGMP global parameters to default.

|                           |                                                                                                                                                                              |                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | last-member-query-interval <1-25>                                                                                                                                            | Sets the time period (in seconds) with which the general queries are sent by the IGMP querier. After timeout expiration the port will be removed from the multicast group.                       |
|                           | proxy reporting                                                                                                                                                              | Enables proxy reporting                                                                                                                                                                          |
|                           | mrouter-timeout <60-600>                                                                                                                                                     | Sets the IGMP snooping router port purge time-out after which the port gets deleted if no IGMP router control packets are received.<br>The default value is 125 seconds.                         |
|                           | port-purge-timeout <130-1225>                                                                                                                                                | Sets the IGMP snooping port purge time interval after which the port gets deleted if no IGMP reports are received.                                                                               |
|                           | report-suppression-interval <1-25>                                                                                                                                           | Sets the IGMP snooping report-suppression time interval for which the IGMPv2 report messages for the same group will not get forwarded onto the router ports.<br>The default value is 5 seconds. |
| <b>Default</b>            | last-member-query-interval – 1 second<br>proxy reporting is disabled<br>mrouter-timeout – 125<br>port-purge-timeout – 260 seconds<br>report-suppression-interval – 5 seconds |                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                       |                                                                                                                                                                                                  |
| <b>History</b>            | 3.1.1400                                                                                                                                                                     |                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                        |                                                                                                                                                                                                  |

**Example**

```
switch (config) # ip igmp snooping report-suppression-interval 3
switch (config) # show ip igmp snooping
```

IGMP snooping global configuration:

```
IGMP snooping globally enabled
IGMP snooping operationally enabled
Proxy-reporting globally disabled
Last member query interval is 1 seconds
Mrouter timeout is 125 seconds
Port purge timeout is 260 seconds
Report suppression interval is 3 seconds
```

```
switch (config) #
```

**Related Commands**

```
ip igmp snooping (admin)
show ip igmp snooping
```

**Note**

## ip igmp snooping fast-leave

**ip igmp snooping fast-leave**  
**no ip igmp snooping fast-leave**

Enables fast leave processing on a specific interface.  
 The no form of the command disables fast leave processing on a specific interface.

|                           |                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | Normal-leave is enabled.                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.1400<br><br>3.3.4500 Added MLAG port-channel configuration mode                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre> switch (config interface ethernet 1/1) # ip igmp snooping fast-leave switch (config interface ethernet 1/1) # show ip igmp snooping inter- faces interface          leave-mode -----          - Eth1/1              Fast Eth1/2              Normal Eth1/3              Normal ... switch (config interface ethernet 1/1) # </pre> |
| <b>Related Commands</b>   | show ip igmp snooping interfaces                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                          |

## ip igmp snooping static-group

**ip igmp snooping static-group** <IP address> interface <type> <number>  
**no ip igmp snooping static-group** <IP address> interface <type> <number>

Creates a static multicast group and attaches a port to a specified group.  
 The no form of the command deletes the interface from the multicast group.

|                    |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                              |  |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--|
| Syntax Description | Ip address                                                                                                                                                                                                                                                                                                                                                                                | Multicast IP address <224.x.x.x - 239.255.255.255>                           |  |
|                    | interface <type> <number>                                                                                                                                                                                                                                                                                                                                                                 | Attach the group to a specific interface.<br>type - ethernet or port-channel |  |
| Default            | No static groups are configured.                                                                                                                                                                                                                                                                                                                                                          |                                                                              |  |
| Configuration Mode | Config VLAN                                                                                                                                                                                                                                                                                                                                                                               |                                                                              |  |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                  |                                                                              |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |  |
| Example            | <pre>switch (config)# vlan 1 switch (config vlan 1) # ip igmp snooping static-group 230.0.0.1 interface ethernet 1/1 switch (config vlan 1) # show ip igmp snooping groups Vlan ID      Group          St/Dyn    Ports ----- 1            230.0.0.1          St        Eth1/1 Total Num of Dynamic Group Addresses 0 Total Num of Static Group Addresses 1 switch (config vlan 1) #</pre> |                                                                              |  |
| Related Commands   | show ip igmp snooping groups                                                                                                                                                                                                                                                                                                                                                              |                                                                              |  |
| Note               | If the deleted interface is the last port, it deletes the entire multicast group.                                                                                                                                                                                                                                                                                                         |                                                                              |  |

## ip igmp snooping mrouter

**ip igmp snooping mrouter interface <type> <number>**  
**no ip igmp snooping mrouter interface <type> <number>**

Creates a static multicast router port on a specific VLAN, on a specific interface.  
 The no form of the command removes the static multicast router port from a specific VLAN.

|                           |                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | interface <type> <number><br>type - ethernet or port-channel.                                                                                                                                                                                       |
| <b>Default</b>            | No static mrouter are configured.                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Config VLAN                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config)# vlan 1 switch (config vlan 1) # ip igmp snooping mrouter interface ethernet 1/1 switch (config vlan 1) # show ip igmp snooping mrouter Vlan          Ports ----- 1              Eth1/1(static) switch (config vlan 1) #</pre> |
| <b>Related Commands</b>   | show ip igmp snooping mrouter                                                                                                                                                                                                                       |
| <b>Note</b>               | The multicast router port can be created only if IGMP snooping is enabled both globally and on the VLAN.                                                                                                                                            |

## ip igmp snooping unregistered multicast

**ip igmp snooping unregistered multicast <options>**

**no ip igmp snooping unregistered multicast**

Sets the behavior of the snooping switch for unregistered multicast traffic.  
The no form of the command sets it default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | options <ul style="list-style-type: none"> <li>• flood</li> <li>• forward-to-mrouter-ports</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | flood                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.2.0500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # ip igmp snooping unregistered multicast flood switch (config) # show ip igmp snooping</pre> <p>IGMP snooping global configuration:</p> <pre>IGMP snooping globally enabled IGMP snooping operationally enabled Proxy-reporting globally disabled Last member query interval is 1 seconds Mrouter timeout is 125 seconds Port purge timeout is 260 seconds Report suppression interval is 5 seconds IGMP snooping unregistered multicast: flood switch (config) #</pre> |
| <b>Related Commands</b>   | show ip igmp snooping                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## ip igmp snooping querier

**ip igmp snooping querier**  
**no ip igmp snooping querier**

Enables the IGMP Snooping Querier on a VLAN.  
 The no form of the command disables the IGMP Snooping Querier on a VLAN.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | Disable                                                                     |
| <b>Configuration Mode</b> | Config VLAN                                                                 |
| <b>History</b>            | 3.3.4200                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config vlan 1)# ip igmp snooping querier<br>switch (config vlan 1)# |
| <b>Related Commands</b>   | igmp snooping querier query-interval<br>show ip igmp snooping querier       |
| <b>Note</b>               |                                                                             |

## igmp snooping querier query-interval

**igmp snooping querier query-interval <time>**  
**no igmp snooping querier query-interval**

Configures the query interval.  
 The no form of the command rests the parameter to its default.

|                           |                                                                                            |                                             |
|---------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Syntax Description</b> | time                                                                                       | Time interval between queries (in seconds). |
| <b>Default</b>            | 125 seconds                                                                                |                                             |
| <b>Configuration Mode</b> | Config VLAN                                                                                |                                             |
| <b>History</b>            | 3.3.4200                                                                                   |                                             |
| <b>Role</b>               | admin                                                                                      |                                             |
| <b>Example</b>            | switch (config vlan 1)# igmp snooping querier query-interval 20<br>switch (config vlan 1)# |                                             |
| <b>Related Commands</b>   | igmp snooping querier query-interval<br>show ip igmp snooping querier                      |                                             |
| <b>Note</b>               |                                                                                            |                                             |



## show ip igmp snooping

### show ip igmp snooping

Displays IGMP snooping information for all VLANs or a specific VLAN.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show ip igmp snooping  IGMP snooping global configuration:  IGMP snooping globally enabled IGMP snooping operationally enabled Proxy-reporting globally disabled Last member query interval is 1 seconds Mrouter timeout is 125 seconds Port purge timeout is 260 seconds Report suppression interval is 3 seconds IGMP snooping unregistered multicast: flood  switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                |

## show ip igmp snooping groups

### show ip igmp snooping groups

Displays per VLAN the list of multicast groups attached (static or dynamic allocated) per port.

|                           |                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch (config) # show ip igmp snooping groups Vlan ID      Group          St/Dyn    Ports ----- 1            230.0.0.1          St        Eth1/1 Total Num of Dynamic Group Addresses 0 Total Num of Static Group Addresses 1 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                             |

## show ip igmp snooping vlan

**show ip igmp snooping vlan {<vlan/vlan-range> | all}**

Displays IGMP configuration per VLAN or VLAN range.

|                           |                                                                                                                                                                                                                                                                     |                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | vlan/vlan range                                                                                                                                                                                                                                                     | Displays IGMP VLAN configuration per specific VLAN or VLAN range. |
|                           | all                                                                                                                                                                                                                                                                 | Display IGMP VLAN configuration on all VLAN.                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                 |                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                    |                                                                   |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                            |                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                               |                                                                   |
| <b>Example</b>            | <pre>switch (config) # show ip igmp vlan 1 Vlan 1 configuration parameters:   IGMP snooping is enabled   IGMP version is V2   Snooping switch is acting as Non-Querier   mrouter static port list: Eth1/1   mrouter dynamic port list: none switch (config) #</pre> |                                                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                     |                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                                                                                     |                                                                   |

## show ip igmp snooping mrouter

### show ip igmp snooping mrouter

Displays IGMP snooping multicast router information.

|                           |                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                     |
| <b>History</b>            | 3.1.1400                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # show ip igmp snooping mrouter Vlan          Ports ----- 1              Eth1/1(static) switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                      |

## show ip igmp snooping interfaces

### show ip igmp snooping interfaces

Displays IGMP snooping interface information.

|                           |                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # show ip igmp snooping interfaces interface          leave-mode ----- 1/1                Normal 1/2                Normal 1/3                Normal 1/4                Fast ... switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                               |

## show ip igmp snooping statistics

### show ip igmp snooping statistics

Displays IGMP snooping statistical counters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show ip igmp snooping statistics Snooping Statistics for VLAN 1   General queries received : 0   Group specific queries received : 0   V1/V2 reports received : 0   V1/V2 reports transmitted : 0   Leave messages received : 0   Group specific queries transmitted: 0   Leave messages transmitted: 0   Unsuccessful joins received count Per Vlan: 0   Active/Successful joins received count Per Vlan: 0   Active Groups count: 0   Packets dropped: 0 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## show ip igmp snooping querier

**show ip igmp snooping querier [vlan <num>]**

Displays running IGMP snooping querier configuration on the VLANs.

|                           |                                                                                                                                                                     |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Syntax Description</b> | vlan <num>                                                                                                                                                          | Displays the IGMP snooping querier configuration running on the specified VLAN. |
| <b>Default</b>            | N/A                                                                                                                                                                 |                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                    |                                                                                 |
| <b>History</b>            | 3.3.4200                                                                                                                                                            |                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                               |                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show ip igmp snooping querier vlan 10 Vlan 1  IGMP Querier Present  query-interval: 20  address: 1.1.1.2  version: 2 switch (config) #</pre> |                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                                                     |                                                                                 |
| <b>Note</b>               |                                                                                                                                                                     |                                                                                 |

## 5.9 Link Layer Discovery Protocol (LLDP)

The Link Layer Discovery Protocol (LLDP) is a vendor-neutral Link Layer protocol in the Internet Protocol Suite used by network devices for advertising their identity, capabilities, and neighbors on a IEEE 802 LAN. The protocol is formally defined in IEEE 802.1AB.

### 5.9.1 Configuring LLDP

➤ *To configure the LLDP on the switch:*

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Enable LLDP globally on the switch. Run:

```
switch (config) # lldp
switch (config) #
```

**Step 4.** Enable LLDP per interface. Run:

```
switch (config interface ethernet 1/1) # lldp receive
switch (config interface ethernet 1/1) # lldp transmit
```

**Step 5.** Show LLDP local information. Run:

```
switch (config) # show lldp local

LLDP is Enabled

Local global configuration
Chassis sub type: macAddress (4)
Chassis id: 00:11:22:33:44:55
System Name: "switch-111111"
System Description: my-system-description
Supported capabilities: B
Supported capabilities enabled: B
```

**Step 6.** Show LLDP remote information. Run:

```
switch (config)# show lldp interfaces ethernet 1/1 remote

Ethernet 1/1
Remote Index: 1
Remote chassis id: 00:11:22:33:44:55 ; chassis id subtype: mac
Remote port-id: ethernet 1/2; port id subtype: local
Remote port description: ethernet 1/2
Remote system name: remote-system
Remote system description: remote-system-description
Remote system capabilities supported: B ; B
```

### 5.9.2 DCBX

Data Center Bridging (DCB) is an enabler for running the Ethernet network with lossless connectivity using priority-based flow control and enhanced transmission selection. DCBx (exchange)



compliments the DCB implementation by offering a dynamic protocol that communicates DCB attributes between peering endpoint.

## 5.9.3 Commands

### lldp

**lldp**  
**no lldp**

Enables LLDP globally.  
The no form of the command disables the LLDP.

|                           |                                           |
|---------------------------|-------------------------------------------|
| <b>Syntax Description</b> | N/A                                       |
| <b>Default</b>            | Disabled                                  |
| <b>Configuration Mode</b> | Config                                    |
| <b>History</b>            | 3.2.0300                                  |
| <b>Role</b>               | admin                                     |
| <b>Example</b>            | switch (config)# lldp<br>switch (config)# |
| <b>Related Commands</b>   | show lldp local                           |
| <b>Note</b>               |                                           |

## lldp reinit

**lldp reinit <seconds>**  
**no lldp reinit**

Sets the delay in seconds from enabling the LLDP on the port until re-initialization will be attempted.  
 The no form of the command sets the parameter to default.

|                           |                                                     |      |
|---------------------------|-----------------------------------------------------|------|
| <b>Syntax Description</b> | seconds                                             | 1-10 |
| <b>Default</b>            | 2                                                   |      |
| <b>Configuration Mode</b> | Config                                              |      |
| <b>History</b>            | 3.2.0300                                            |      |
| <b>Role</b>               | admin                                               |      |
| <b>Example</b>            | switch (config)# lldp reinit 10<br>switch (config)# |      |
| <b>Related Commands</b>   | show lldp timers                                    |      |
| <b>Note</b>               |                                                     |      |

## lldp timer

**lldp timer <seconds>**  
**no lldp timer**

Sets the LLDP interval at which LLDP frames are transmitted. (lldpMessageTxInterval)  
 The no form of the command sets the parameter to default.

|                           |                                                    |         |
|---------------------------|----------------------------------------------------|---------|
| <b>Syntax Description</b> | seconds                                            | 5-32768 |
| <b>Default</b>            | 30                                                 |         |
| <b>Configuration Mode</b> | Config                                             |         |
| <b>History</b>            | 3.2.0300                                           |         |
| <b>Role</b>               | admin                                              |         |
| <b>Example</b>            | switch (config)# lldp timer 10<br>switch (config)# |         |
| <b>Related Commands</b>   | show lldp timers                                   |         |
| <b>Note</b>               |                                                    |         |

## lldp tx-delay

**lldp tx-delay <seconds>**

**no lldp tx-delay**

Indicates the delay in seconds between successive LLDP frame transmissions  
The no form of the command sets the parameter to default.

|                           |                                                                                                                                          |        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>Syntax Description</b> | seconds                                                                                                                                  | 1-8192 |
| <b>Default</b>            | 2                                                                                                                                        |        |
| <b>Configuration Mode</b> | Config                                                                                                                                   |        |
| <b>History</b>            | 3.2.0300                                                                                                                                 |        |
| <b>Role</b>               | admin                                                                                                                                    |        |
| <b>Example</b>            | switch (config)# lldp tx-delay 10<br>switch (config)#                                                                                    |        |
| <b>Related Commands</b>   | show lldp timers                                                                                                                         |        |
| <b>Note</b>               | The recommended value for the tx-delay is set by the following formula:<br>$1 \leq \text{lldp tx-delay} \leq (0.25 * \text{lldp timer})$ |        |

## lldp tx-hold-multiplier

**lldp tx-hold-multiplier <seconds>**

**no lldp tx-hold-multiplier**

The time-to-live value expressed as a multiple of the lldpMessageTxInterval object. The no form of the command sets the parameter to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                |        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                                                                                                                                                        | 1-8192 |
| <b>Default</b>            | 2                                                                                                                                                                                                                                                                                                                                                              |        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                         |        |
| <b>History</b>            | 3.2.0300                                                                                                                                                                                                                                                                                                                                                       |        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                          |        |
| <b>Example</b>            | switch (config)# lldp tx-hold-multiplier 10<br>switch (config)#                                                                                                                                                                                                                                                                                                |        |
| <b>Related Commands</b>   | show lldp timers                                                                                                                                                                                                                                                                                                                                               |        |
| <b>Note</b>               | The actual time-to-live value used in LLDP frames, can be expressed by the following formula: $TTL = \min(65535, (lldpMessageTxInterval * lldpMessageTxHoldMultiplier))$ For example, if the value of lldpMessageTxInterval is '30', and the value of lldpMessageTxHoldMultiplier is '4', then the value '120' is encoded in the TTL field in the LLDP header. |        |

## lldp {receive | transmit}

**lldp {receive | transmit}**  
**no lldp {receive | transmit}**

Enables LLDP to be received or transmitted on this port.  
 The no form of the command disables the LLDP to be received or transmitted on this port.

|                           |                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                      |
| <b>Default</b>            | Enabled for receive and Transmit.                                                                                                                        |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                                                                                |
| <b>History</b>            | 3.2.0300                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                    |
| <b>Example</b>            | switch (config interface ethernet 1/1)# lldp receive<br>switch (config interface ethernet 1/1)# lldp transmit<br>switch (config interface ethernet 1/1)# |
| <b>Related Commands</b>   | show lldp interface                                                                                                                                      |
| <b>Note</b>               | The LLDP is disabled by default (globally)                                                                                                               |

## lldp tlv-select

**lldp tlv-select** {[dcbx] [dcbx-cee] [port-description] [sys-name] [sys-description] [sys-capabilities] [management-address] [none] all}

Sets the LLDP basic TLVs to be transmitted on this port.

|                           |                                                                                                                                      |                               |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | dcbx                                                                                                                                 | Enables LLDP-DCBX TLVs.       |
|                           | dcbx-cee                                                                                                                             | Enables LLDP-DCBX CEE TLVs.   |
|                           | port-description                                                                                                                     | LLDP port description TLV.    |
|                           | sys-name                                                                                                                             | LLDP system name TLV.         |
|                           | sys-description                                                                                                                      | LLDP system description TLV.  |
|                           | sys-capabilities                                                                                                                     | LLDP system capabilities TLV. |
|                           | management-address                                                                                                                   | LLDP management address TLV.  |
|                           | all                                                                                                                                  | all above TLVs.               |
|                           | none                                                                                                                                 | None of the above TLVs.       |
| <b>Default</b>            | all                                                                                                                                  |                               |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                                                            |                               |
| <b>History</b>            | 3.2.0300                                                                                                                             | Initial revision              |
|                           | 3.3.0000                                                                                                                             | Added “none” parameter        |
|                           | 3.3.4302                                                                                                                             | Added “dcbx” parameter        |
|                           | 3.3.4402                                                                                                                             | Added “dcbx-cee” parameter    |
| <b>Role</b>               | admin                                                                                                                                |                               |
| <b>Example</b>            | <pre>switch (config interface ethernet 1/1)# lldp tlv-select port-description sys-name switch (config interface ethernet 1/1)#</pre> |                               |
| <b>Related Commands</b>   | show lldp interface                                                                                                                  |                               |
| <b>Note</b>               |                                                                                                                                      |                               |



## dcb application-priority

**dcb application-priority** <selector> <protocol> <priority>

Adds an application to the application priority table.

|                           |                                                                                      |                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | selector                                                                             | Protocol type: ethertype                                                           |
|                           | protocol                                                                             | Protocol field in hexadecimal notation (e.g. '0x8906' for FCoE, '0x8914' for FIP). |
|                           | priority                                                                             | Range: 0-7.                                                                        |
| <b>Default</b>            | No applications are available. The table is empty.                                   |                                                                                    |
| <b>Configuration Mode</b> | Config                                                                               |                                                                                    |
| <b>History</b>            | 3.3.4200                                                                             |                                                                                    |
|                           | 3.4.0008                                                                             |                                                                                    |
| <b>Role</b>               | admin                                                                                |                                                                                    |
| <b>Example</b>            | switch (config-if)# dcb application-priority ethertype 0x8906<br>switch (config-if)# |                                                                                    |
| <b>Related Commands</b>   | show lldp interface                                                                  |                                                                                    |
| <b>Note</b>               |                                                                                      |                                                                                    |

## show lldp local

### show lldp local

Shows LLDP local information.

|                           |                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.2.0300                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config)# show lldp local  LLDP is Enabled  Local global configuration  Chassis sub type: macAddress (4) Chassis id: 0002C9030046AF00 System Name: my-switch System Description: SX1036 Supported capabilities: B,R Supported capabilities enabled: B  switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                           |

## show lldp interface

**show lldp interface [ethernet <inf>]**

Shows LLDP local interface table information.

|                    |                                                                                                                                                                                                                                                                 |                              |          |                            |                              |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------|----------------------------|------------------------------|
| Syntax Description | inf                                                                                                                                                                                                                                                             | Interface number (e.g. 1/1). |          |                            |                              |
| Default            | N/A                                                                                                                                                                                                                                                             |                              |          |                            |                              |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                |                              |          |                            |                              |
| History            | 3.2.0300                                                                                                                                                                                                                                                        | First version                |          |                            |                              |
|                    | 3.3.4200                                                                                                                                                                                                                                                        | Updated example              |          |                            |                              |
|                    | 3.3.4402                                                                                                                                                                                                                                                        | Updated example              |          |                            |                              |
| Role               | admin                                                                                                                                                                                                                                                           |                              |          |                            |                              |
| Example            | switch (config)# show lldp interface ethernet 1/1                                                                                                                                                                                                               |                              |          |                            |                              |
|                    | TLV flags:                                                                                                                                                                                                                                                      |                              |          |                            |                              |
|                    | PD: port-description, SN: sys-name, SD: sys-description, SC: sys-capabilities, MA: management-address, ETS-C: ETS-Configuration, ETS-R: ETS-Recommendation, AP: Application Priority, PFC: Priority Flow Control, CEE: Converged Enhanced Ethernet DCBX version |                              |          |                            |                              |
|                    | Interface                                                                                                                                                                                                                                                       | Receive                      | Transmit | Notification               | TLVs                         |
|                    | eth1/1                                                                                                                                                                                                                                                          | Enable                       | Enable   | Enable                     | PD, SN, SD, SC, MA, PFC, CEE |
| eth1/2             | Disable                                                                                                                                                                                                                                                         | Disable                      | Enable   | PD, SN, SD, MA, AP         |                              |
| eth1/3             | Enable                                                                                                                                                                                                                                                          | Disable                      | Disable  | PD, SD, SC, ETS-R, AP, PFC |                              |
| ...                |                                                                                                                                                                                                                                                                 |                              |          |                            |                              |
|                    | switch (config)#                                                                                                                                                                                                                                                |                              |          |                            |                              |
| Related Commands   |                                                                                                                                                                                                                                                                 |                              |          |                            |                              |
| Note               |                                                                                                                                                                                                                                                                 |                              |          |                            |                              |

## show lldp interfaces ethernet <inf> remote

### show lldp interfaces ethernet <inf> remote

Shows LLDP remote interface table information.

|                           |                  |                                    |
|---------------------------|------------------|------------------------------------|
| <b>Syntax Description</b> | inf              | Local interface number (e.g. 1/1). |
| <b>Default</b>            | N/A              |                                    |
| <b>Configuration Mode</b> | Any Command Mode |                                    |
| <b>History</b>            | 3.2.0300         | First version                      |
|                           | 3.3.4200         | Updated output                     |
| <b>Role</b>               | admin            |                                    |

**Example**

```

switch (config)# show lldp interfaces ethernet <number> Ethernet <port-number> // example "Ethernet 1/1"
Latest LLDPDU received on <date> // e.g. date: "Thu Feb 14 12:08:29 2013" - new field
Remote Index:
Remote chassis id: <byte array> ; chassis id subtype: <sub-type>
Remote port-id: <byte array> ; port id subtype: <sub-type>
Remote port description: <byte array>
Remote system name: <byte array>
Remote system description: < byte array>
Remote system capabilities supported: <enum parsed as defined in the MIB> ; enable <enum parsed as defined in the
MIB>
Management Table //theoretically remote can send more then one management address (Future) RemoteIndex Subtype Address
ifSubtype ifId OID
1 ipv4(1) 10.10.10.10 ifIndex(2) 1(mgmt0) <Did>
1 ipv4(1) 10.10.10.11 ifIndex(3) 2(mgmt1) <Did>
Unknown TLVs Table //(Future) Type Info

<integer> <byte-array>
<integer> <byte-array>
Organizationally-Defined Information Table // (Future) OUI subtype Index DefInfo

<byte-array> <integer> <integer> <byte-array>
<byte-array> <integer> <integer> <byte-array>
Remote PFC configuration // new section Willing: {enabled, disabled}
MACsec: {enabled, disabled}
Number of supported traffic classes: 4 // range is 1-8
PFC enabled on priorities: 5 7 // it could be "0 1 2 3 4 5 6 7" or " 1 3 7" or "None"
WARNING: peer PFC configuration does not match the local PFC configuration // This warning should appear only if the
local and remote PFC configuration don't match!
Remote ETS configuration // new section Willing: {enabled, disabled}
CBS: {enabled, disabled}
Number of supported traffic classes: 3 // range is 1-8
WARNING: peer ETS configuration does not match the local ETS configuration // This warning should appear only if the
local and remote ETS configuration don't match!
Priority assignment table: Priority TC

0
0
1
0
2
1
3
1
4
2
5
2
6
3
7
3
Traffic class bandwidth table // (No need to have the recommended TC - ETS-Recommended TLV)
TC Bandwidth TSA

Page 43 of 354
0 25% tsaStrictPriority(0) // we are expecting either 0 or 2 as answers.

```

**Related Commands****Note**

## show lldp timers

### show lldp timers

Shows LLDP timers configuration

|                           |                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                     |
| <b>Default</b>            | N/A                                                                                                                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                        |
| <b>History</b>            | 3.2.0300                                                                                                                |
| <b>Role</b>               | admin                                                                                                                   |
| <b>Example</b>            | <pre>switch (config)# show lldp timers msg-tx-interval:30 tx-delay:2 tx-hold:4 tx-reinit-delay:2 switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                         |
| <b>Note</b>               |                                                                                                                         |

## show lldp statistics global

### show lldp statistics global

Shows LLDP global statistics

|                           |                                                                                                                                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                      |
| <b>History</b>            | 3.2.0300                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config)# show lldp timers Remote Table Last Change Time : 10300 Remote Table Inserts : 5 Remote Table Deletes : 0 Remote Table Drops : 0 Remote Table Ageouts : 0 switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                                                       |

## show lldp statistics [interface ethernet <inf>]

**show lldp statistics [interface ethernet <inf>]**

Shows LLDP interface statistics

|                           |                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.2.0300                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config)# show lldp statistics ethernet 1/1 Interface Frames      In      In      TLVs      TLVs      Ageout Out               Discarded Errors Total Discarded Unrecognize      Frames ----- Eth 1/1         0         0      10       0         0         0         0 switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                            |



## show dcb application-priority

### show dcb application-priority

Displays application priority admin table.

|                    |                                                                                                                                                                                                                                                                                                                                                        |          |          |          |       |  |  |           |        |   |           |        |   |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|-------|--|--|-----------|--------|---|-----------|--------|---|
| Syntax Description | N/A                                                                                                                                                                                                                                                                                                                                                    |          |          |          |       |  |  |           |        |   |           |        |   |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                    |          |          |          |       |  |  |           |        |   |           |        |   |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                       |          |          |          |       |  |  |           |        |   |           |        |   |
| History            | 3.3.4200                                                                                                                                                                                                                                                                                                                                               |          |          |          |       |  |  |           |        |   |           |        |   |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                  |          |          |          |       |  |  |           |        |   |           |        |   |
| Example            | <pre>switch (config)# show dcb application-priority</pre> <p>Application priority configuration</p> <table><tr><td>Selector</td><td>Protocol</td><td>Priority</td></tr><tr><td colspan="3">-----</td></tr><tr><td>Ethertype</td><td>0x8906</td><td>3</td></tr><tr><td>Ethertype</td><td>0x8914</td><td>3</td></tr></table> <pre>switch (config)#</pre> | Selector | Protocol | Priority | ----- |  |  | Ethertype | 0x8906 | 3 | Ethertype | 0x8914 | 3 |
| Selector           | Protocol                                                                                                                                                                                                                                                                                                                                               | Priority |          |          |       |  |  |           |        |   |           |        |   |
| -----              |                                                                                                                                                                                                                                                                                                                                                        |          |          |          |       |  |  |           |        |   |           |        |   |
| Ethertype          | 0x8906                                                                                                                                                                                                                                                                                                                                                 | 3        |          |          |       |  |  |           |        |   |           |        |   |
| Ethertype          | 0x8914                                                                                                                                                                                                                                                                                                                                                 | 3        |          |          |       |  |  |           |        |   |           |        |   |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                        |          |          |          |       |  |  |           |        |   |           |        |   |
| Note               |                                                                                                                                                                                                                                                                                                                                                        |          |          |          |       |  |  |           |        |   |           |        |   |

## 5.10 Quality of Service (QoS)

### 5.10.1 Priority Flow Control and Link Level Flow Control

Priority Flow Control (PFC) provides an enhancement to the existing pause mechanism in Ethernet. The current Ethernet pause option stops all traffic on a link. PFC creates eight separate virtual links on the physical link and allows any of these links to be paused and restarted independently, enabling the network to create a no-drop class of service for an individual virtual link. PFC has 8 possible priorities (3 bits in VLAN header). Each priority can be mapped to one of 4 possible queues in the ingress.

The PFC software offers the following features:

- Provides per-priority enabling or disabling of flow control
- Transmits PFC-PAUSE frames when the receive threshold for a particular traffic class is reached
- Provides the management capability for an administrator to configure the flow control properties on each port of the switch
- Keeps flow control disabled for all priorities on all ports by default
- Allows an administrator to enable or disable flow control per port and per priority level
- Supports flow control only on physical ports, not on logical interfaces such as tunnels or interfaces defined by sharing a physical port in multiple virtual switch contexts
- Uses the configured threshold values to set up the queue buffer spaces accordingly in the datapath
- Provides hardware abstraction layer callouts for the following:
  - Enabling or disabling of flow control on each port for each priority
  - Configuring the queue depth for each priority on each port
- Provides trace logs for execution upon error conditions and for any event notifications from the hardware or datapath. These trace logs are a useful aid in troubleshooting.
- Allows the administrator to configure the minimum and maximum threshold values for flow control. These configurations are applied globally on all ports and priorities.

Priority Based Flow Control (PFC) provides an enhancement to the existing pause flow control mechanism as described in 802.1X.

#### ➤ **To enable PFC globally:**

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Enable PFC globally on the switch. Run:

```
switch (config) # dcb priority-flow-control enable
This action might cause traffic loss while shutting down a port with priority-flow-control mode on
Type 'yes' to confirm enable pfc globally: yes
```

#### ➤ **To enable PFC per priority:**

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Enable PFC globally on the switch. Run:

```
switch (config) # dcb priority-flow-control enable
dcb priority-flow-control enable
This action might cause traffic loss while shutting down a port with priority-flow-control mode on
Type 'yes' to confirm enable pfc globally: yes
switch (config) #
```

**Step 4.** Choose the desirable priority you want to enable using the command `dcb priority-flow-control priority <pri[0..7]> enable`.

```
switch (config) # dcb priority-flow-control priority 5 enable
```

➤ **To enable PFC per interface:**

**Step 1.** Log in as admin.

**Step 2.** Change to config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Enable PFC globally on the switch. Run:

```
switch (config) # dcb priority-flow-control enable
```

**Step 4.** Choose the desirable priority you want to enable using the command `dcb priority-flow-control priority <pri[0..7]> enable`

```
switch (config) # dcb priority-flow-control 5 enable
```

**Step 5.** Change to Interface mode. Run:

```
switch (config) #
switch (config) # interface ethernet 1/1
switch (config interface ethernet 1/1) #
```

**Step 6.** Enable PFC for the specific interface:

```
switch (config interface ethernet 1/1) # dcb priority-flow-control mode on
```

## 5.10.2 Enhanced Transmission Selection (ETS)

Enhanced Transmission Selection (ETS) provides a common management framework for assignment of bandwidth to traffic classes, for weighted round robin (WRR) scheduling. If a traffic class does not use all the bandwidth allocated to it, other traffic classes can use that available bandwidth. This allows optimal utilization of the network capacity while prioritizing and providing the necessary resources.

The ETS feature has the following attributes:

- ETS global admin:
  - Enable (default) – scheduling mode is WRR according to the configured bandwidth-per-traffic class
  - Disable – scheduling mode is Strict Priority (SP)

- Bandwidth percentage for each traffic class: By default each traffic class gets an equal share

The default mapping of priority to traffic classes (per interface) is as follows:

- Priority 0,1 mapped to TC 0
- Priority 2,3 mapped to TC 1
- Priority 4,5 mapped to TC 2
- Priority 6,7 mapped to TC 3



TC0 and TC3 are lossy TCs, while TC1 and TC2 can be lossless as well as lossy. It is possible but not recommended to map PFC enabled priorities (lossless traffic) to those TC0 or TC3.

ETS is enabled by default (scheduling is WRR).

➤ **To set the scheduling mode to Strict Priority:**

**Step 1.** Run the command `dcb ets disable`.

```
switch (config) # no dcb ets enable
```

➤ **To configure the WRR bandwidth percentage:**

**Step 1.** Make sure ETS feature is enabled. Run:

```
switch (config) # dcb ets enable
```

**Step 2.** Choose the WRR bandwidth rate and distribution.

By default the WRR distribution function is equal 25% per TC. Changing the WRR bandwidth rate will cause a change in the distribution function, for example if you wish to schedule more traffic on TC-0, TC-1, TC-2 while reducing the amount of traffic sent on TC-3, run the command `dcb ets tc bandwidth`.

```
switch (config) # dcb ets tc bandwidth 30 30 30 10
show dcb ets
```

ETS enabled

| TC | Bandwidth |
|----|-----------|
| 0  | 30%       |
| 1  | 30%       |
| 2  | 30%       |
| 3  | 10%       |

Number of Traffic Class: 4  
switch (config) #



Traffic class priorities are <0-3>, where 0 is the lowest and 3 is the highest.



The sum of all traffic class bandwidth value (in percentage) should be 100, otherwise the command fails.

**Step 3.** Run the command `show dcb ets` to verify the configuration.

```
switch (config) # show dcb ets
ETS enabled
```

| TC | Bandwidth |
|----|-----------|
| 0  | 30%       |
| 1  | 30%       |
| 2  | 10%       |
| 3  | 30%       |

```
Number of Traffic Class: 4
switch (config) #
```

## 5.10.3 Commands

### 5.10.3.1 Enhanced Transmission Selection (ETS)

#### dcb ets enable

**dcb ets enable**  
**no dcb ets enable**

Sets the switch egress scheduling mode to be weighted round robin.  
 The no form of the command sets the switch egress scheduling mode to be strict priority.

| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                   |    |           |   |     |   |     |   |     |   |     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------|---|-----|---|-----|---|-----|---|-----|
| <b>Default</b>            | ETS is enabled.                                                                                                                                                                                                                                                                                                                                                                       |    |           |   |     |   |     |   |     |   |     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                |    |           |   |     |   |     |   |     |   |     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                              |    |           |   |     |   |     |   |     |   |     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                 |    |           |   |     |   |     |   |     |   |     |
| <b>Example</b>            | <pre>switch (config)# dcb ets enable switch (config)# show dcb ets</pre> <p>ETS enabled</p> <table> <thead> <tr> <th>TC</th><th>Bandwidth</th></tr> </thead> <tbody> <tr><td>0</td><td>25%</td></tr> <tr><td>1</td><td>25%</td></tr> <tr><td>2</td><td>25%</td></tr> <tr><td>3</td><td>25%</td></tr> </tbody> </table> <p>Number of Traffic Class: 4</p> <pre>switch (config) #</pre> | TC | Bandwidth | 0 | 25% | 1 | 25% | 2 | 25% | 3 | 25% |
| TC                        | Bandwidth                                                                                                                                                                                                                                                                                                                                                                             |    |           |   |     |   |     |   |     |   |     |
| 0                         | 25%                                                                                                                                                                                                                                                                                                                                                                                   |    |           |   |     |   |     |   |     |   |     |
| 1                         | 25%                                                                                                                                                                                                                                                                                                                                                                                   |    |           |   |     |   |     |   |     |   |     |
| 2                         | 25%                                                                                                                                                                                                                                                                                                                                                                                   |    |           |   |     |   |     |   |     |   |     |
| 3                         | 25%                                                                                                                                                                                                                                                                                                                                                                                   |    |           |   |     |   |     |   |     |   |     |
| <b>Related Commands</b>   | show dcb ets                                                                                                                                                                                                                                                                                                                                                                          |    |           |   |     |   |     |   |     |   |     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                       |    |           |   |     |   |     |   |     |   |     |

## dcb ets tc bandwidth

**dcb ets tc bandwidth** <tc-0> <tc-1> <tc-2> <tc-3>  
**no dcb ets tc bandwidth**

Configures the bandwidth limit of the traffic class.  
 The no form of the command sets the bandwidths per traffic class back to its default.

|                           |                                                                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | tc-i 0-100.                                                                                                                                                                                                                                                                          |
| <b>Default</b>            | 25% per traffic class.                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config)# dcb ets tc bandwidth 20 20 30 30 switch (config) # show dcb ets</pre> <p>ETS enabled</p> <pre>TC          Bandwidth ----- 0           20% 1           20% 2           30% 3           30%</pre> <p>Number of Traffic Class: 4</p> <pre>switch (config) #</pre> |
| <b>Related Commands</b>   | show dcb ets                                                                                                                                                                                                                                                                         |
| <b>Note</b>               | The sum of all traffic class bandwidth must be equal to 100.                                                                                                                                                                                                                         |

## vlan map-priority

**vlan map priority <priority> traffic-class <tc>**  
**no vlan map priority <priority>**

Maps an VLAN user priority to a traffic class.  
 The no form of the command sets the mapping back to default.

|                           |                                                                                                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                          |
| <b>Default</b>            | Priority 0,1 mapped to tc 0.<br>Priority 2,3 mapped to tc 1.<br>Priority 4,5 mapped to tc 2.<br>Priority 6,7 mapped to tc 3. |
| <b>Configuration Mode</b> | Config Interface Ethernet                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                        |
| <b>Example</b>            | switch (config interface ethernet 1/1) # vlan map-priority 1 traffic-class 2<br>switch (config interface ethernet 1/1) #     |
| <b>Related Commands</b>   | show dcb ets interface                                                                                                       |
| <b>Note</b>               |                                                                                                                              |



## show dcb ets

### show dcb ets

Displays ETS configuration and operational data.

---

#### Syntax Description

---

|                |                 |
|----------------|-----------------|
| <b>Default</b> | ETS is enabled. |
|----------------|-----------------|

|                           |                  |
|---------------------------|------------------|
| <b>Configuration Mode</b> | Any Command Mode |
|---------------------------|------------------|

|                |          |
|----------------|----------|
| <b>History</b> | 3.1.0000 |
|----------------|----------|

|             |       |
|-------------|-------|
| <b>Role</b> | admin |
|-------------|-------|

|                |                               |
|----------------|-------------------------------|
| <b>Example</b> | switch (config)# show dcb ets |
|----------------|-------------------------------|

ETS enabled

| TC | Bandwidth |
|----|-----------|
| 0  | 25%       |
| 1  | 25%       |
| 2  | 25%       |
| 3  | 25%       |

Number of Traffic Class: 4

switch (config) #

---

#### Related Commands

---

#### Note

---

---

# show dcb ets interface

**show dcb ets interface** <type> <number>

Displays ETS configuration and operational data, per interface.

|                           |                  |                            |
|---------------------------|------------------|----------------------------|
| <b>Syntax Description</b> | type             | ethernet or port-channel   |
|                           | number           | interface number, i.e. 1/1 |
| <b>Default</b>            | ETS is enabled.  |                            |
| <b>Configuration Mode</b> | Any Command Mode |                            |
| <b>History</b>            | 3.1.0000         |                            |
| <b>Role</b>               | admin            |                            |

**Example**

```
switch (config)# show dcb ets interface ethernet 1/1
```

```
ETS Port Mode :ON MODE
ETS Oper State :INIT STATE
ETS State Machine Type :Assymetric
```

```

ETS Local Port Info

```

```
TC bandwidth table

```

| TC | Bandwidth | RecomBandwidth |
|----|-----------|----------------|
| 0  | 25%       | 25%            |
| 1  | 25%       | 25%            |
| 2  | 25%       | 25%            |
| 3  | 25%       | 25%            |

```
priority assignment table

```

| Priority | TC |
|----------|----|
| 0        | 0  |
| 1        | 0  |
| 2        | 1  |
| 3        | 1  |
| 4        | 2  |
| 5        | 2  |
| 6        | 3  |
| 7        | 3  |

```
Number of Traffic Class: 4
```

```
Willing Status: Disable

```

```
ETS Admin Port Info

```

| TC | Bandwidth | RecomBandwidth |
|----|-----------|----------------|
| 0  | 30%       | 30%            |
| 1  | 30%       | 30%            |
| 2  | 30%       | 30%            |
| 3  | 10%       | 10%            |

```

ETS Remote Port Info

```

```
No Remote Entry is Present

```

```
switch (config) #
```

**Related Commands****Note**

### 5.10.3.2 Priority Flow Control (PFC)

#### dcb priority-flow-control enable

**dcb priority-flow-control enable [force]**  
**no dcb priority-flow-control enable [force]**

Enables PFC globally on the switch.  
 The no form of the command globally disables PFC on the switch.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Syntax Description</b> | force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Forces operation |
| <b>Default</b>            | PFC is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Initial revision |
|                           | 3.3.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Output update    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
| <b>Example</b>            | <pre>switch (config)# dcb priority-flow-control enable This action might cause traffic loss while shutting down a port with priority-flow-control mode on Type 'yes' to confirm enable pfc globally: yes switch (config)# show dcb priority-flow-control  PFC enabled Priority Enabled List      : Priority Disabled List    :0 1 2 3 4 5 6 7  TC      Lossless ---      - 0        N 1        Y 2        Y 3        N  Interface      PFC admin      PFC oper ----- 1/1            Disabled      Disabled 1/2            Disabled      Disabled 1/3            Disabled      Disabled 1/4            Disabled      Disabled ... switch (config) #</pre> |                  |
| <b>Related Commands</b>   | show dcb priority-flow-control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |
| <b>Note</b>               | This command asks the user to approve traffic loss because there might be interfaces with dcb mode on, that will be shutdown.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |

## dcb priority-flow-control priority

**dcb priority-flow-control priority <prio> enable**  
**no dcb priority-flow-control priority <prio> enable**

Enables PFC per priority on the switch.  
 The no form of the command disables PFC per priority on the switch.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|----------|-----|-------|---|---|---|---|---|---|---|---|-----------|-----------|----------|-------|-------|-------|-----|----------|----------|-----|----------|----------|-----|----------|----------|-----|----------|----------|-----|--|--|
| Syntax Description | prio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0-7.     |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Default            | PFC is disabled for all priorities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Example            | <pre>switch (config)# dcb priority-flow-control priority 0 enable switch (config)# show dcb priority-flow-control</pre> <p>PFC enabled<br/>Priority Enabled List      : 0<br/>Priority Disabled List    : 1 2 3 4 5 6 7</p> <table><tr><td>TC</td><td>Lossless</td></tr><tr><td>---</td><td>-----</td></tr><tr><td>0</td><td>N</td></tr><tr><td>1</td><td>Y</td></tr><tr><td>2</td><td>Y</td></tr><tr><td>3</td><td>N</td></tr></table><br><table><tr><td>Interface</td><td>PFC admin</td><td>PFC oper</td></tr><tr><td>-----</td><td>-----</td><td>-----</td></tr><tr><td>1/1</td><td>Disabled</td><td>Disabled</td></tr><tr><td>1/2</td><td>Disabled</td><td>Disabled</td></tr><tr><td>1/3</td><td>Disabled</td><td>Disabled</td></tr><tr><td>1/4</td><td>Disabled</td><td>Disabled</td></tr><tr><td>...</td><td></td><td></td></tr></table> <pre>switch (config) #</pre> |          | TC | Lossless | --- | ----- | 0 | N | 1 | Y | 2 | Y | 3 | N | Interface | PFC admin | PFC oper | ----- | ----- | ----- | 1/1 | Disabled | Disabled | 1/2 | Disabled | Disabled | 1/3 | Disabled | Disabled | 1/4 | Disabled | Disabled | ... |  |  |
| TC                 | Lossless                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| ---                | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 0                  | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 1                  | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 2                  | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 3                  | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Interface          | PFC admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | PFC oper |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| -----              | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -----    |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 1/1                | Disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Disabled |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 1/2                | Disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Disabled |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 1/3                | Disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Disabled |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| 1/4                | Disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Disabled |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| ...                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Related Commands   | show dcb priority-flow-control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |    |          |     |       |   |   |   |   |   |   |   |   |           |           |          |       |       |       |     |          |          |     |          |          |     |          |          |     |          |          |     |  |  |

## dcb priority-flow-control mode on

**dcb priority-flow-control mode on [force]**

**no dcb priority-flow-control mode**

Enables PFC per interface.

The no form of the command disables PFC per interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Force command implementation. |
| <b>Default</b>            | PFC is disabled for all interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                               |
| <b>History</b>            | 3.1.0000<br><br>3.3.4500 Added MLAG port-channel configuration mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                               |
| <b>Example</b>            | <pre> switch (config interface ethernet 1/1) # dcb priority-flow-control mode on switch (config interface ethernet 1/1) # show dcb priority-flow-control  PFC enabled Priority Enabled List      : 0 Priority Disabled List    : 1 2 3 4 5 6 7  TC      Lossless ---      - 0        N 1        Y 2        Y 3        N  Interface      PFC admin      PFC oper ----- 1/1            On            Enabled 1/2            Disabled       Disabled 1/3            Disabled       Disabled 1/4            Disabled       Disabled ... switch (config) # </pre> |                               |
| <b>Related Commands</b>   | show dcb priority-flow-control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |

## show dcb priority-flow-control

**show dcb priority-flow-control** [interface <type> <inf>] [detail]

Displays DCB priority flow control configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>ethernet</li> <li>port-channel</li> </ul> |
|                           | inf                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The interface number.                                                            |
|                           | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Adds details information to the show output.                                     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                  |
| <b>Example</b>            | <pre> switch (config interface ethernet 1/1) # show dcb priority-flow-control  PFC enabled Priority Enabled List      : 0 Priority Disabled List    : 1 2 3 4 5 6 7  TC      Lossless ---      - 0        N 1        Y 2        Y 3        N  Interface      PFC admin      PFC oper ----- 1/1            On            Enabled 1/2            Disabled      Disabled 1/3            Disabled      Disabled 1/4            Disabled      Disabled ... switch (config) # </pre> |                                                                                  |

### Related Commands

### Note

## 5.11 Access Control List

An Access Control List (ACL) is a list of permissions attached to an object, to filter or match switches packets. When the pattern is matched at the hardware lookup engine, a specified action (e.g. permit/deny) is applied. The rule fields represent flow characteristics such as source and destination addresses, protocol and VLAN ID.

ACL support currently allows actions of *permit* or *deny* rules, and supports only ingress direction. ACL search pattern can be taken from either L2 or L3 fields, e.g L2/L3 source and destination addresses, protocol, VLAN ID and priority or TCP port.

### 5.11.1 Configuring Access Control List

Access Control List (ACL) is configured by the user and is applied to a port once the ACL search engine matches search criteria with a received packet.

➤ **To configure ACL:**

**Step 1.** Log in as admin.

**Step 2.** Enter config mode. Run:

```
switch > enable
switch # configure terminal
```

**Step 3.** Create a MAC / IPv4 ACL (access-list) entity.

```
switch (config) mac access-list mac-acl
switch (config mac access-list mac-acl) #
```

**Step 4.** Add a MAC / IP rules to the appropriate access-list.

```
switch (config mac access-list mac-acl) seq-number 10 deny 0a:0a:0a:0a:0a:0a mask
ff:ff:ff:ff:ff:ff any vlan 6 cos 2 protocol 80
switch (config mac access-list mac-acl) #
```

**Step 5.** Bind the created access-list to an interface (slot/port or port-channel).

```
switch (config)
switch (config) # interface ethernet 1/1
switch (config interface ethernet 1/1) # mac port access-group mac-acl
```

### 5.11.2 ACL Actions

An ACL action is a set of actions can be activated in case the packet hits the ACL rule.

➤ **To modify the VLAN tag of the egress traffic as part of the ACL “permit” rule:**

**Step 1.** Create access-list action profile:

- a. Create an action access-list profile using the command `access-list action <action-profile-name>`
- b. Add rule to map a VLAN using the command `vlan-map <vlan-id>` within the action profile configuration mode

**Step 2.** Create an access-list and bind the action rule:

- a. Create an access-list profile using the command `ipv4/mac access-list`
- b. Add access list rule using the command `deny/permit (action <action profile name>)`



**Step 3.** Bind the access-list to an interface using the command `ipv4/mac port access-group`

Create an action profile and add vlan mapping action:

```
switch (config)#access-list action my-action
switch (config access-list action my-action) # vlan-map 20
switch (config access-list action my-action) #exit
```

Create an access list and bind rules:

```
switch (config)# mac access-list my-list
switch (config mac access-list my-list)# permit any any action my-action
switch (config mac access-list my-list)# exit
```

Bind an access-list to a port:

```
Switch (config)# interface ethernet 1/1
Switch (config interface ethernet 1/1)# mac port access-group my-list
```

## 5.11.3 Commands

### ipv4/mac access-list

**{ipv4 | mac} access-list <acl-name>**  
**no {ipv4 | mac} access-list <acl-name>**

Creates a MAC or IPv4 ACL and enter the ACL configuration mode.  
 The no form of the command deletes the ACL.

|                           |                                                                                               |                                  |
|---------------------------|-----------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | ipv4   mac                                                                                    | IPv4 or MAC – access list.       |
|                           | acl-name                                                                                      | User defined string for the ACL. |
| <b>Default</b>            | No ACL available by default.                                                                  |                                  |
| <b>Configuration Mode</b> | Config                                                                                        |                                  |
| <b>History</b>            | 3.1.1400                                                                                      |                                  |
| <b>Role</b>               | admin                                                                                         |                                  |
| <b>Example</b>            | switch (config)# mac access-list my-mac-list<br>switch (config) mac access-list my-mac-list)# |                                  |
| <b>Related Commands</b>   | ipv4/port access-group                                                                        |                                  |
| <b>Note</b>               |                                                                                               |                                  |

## ipv4/mac port access-group

**{ipv4 | mac} port access-list <acl-name>**  
**no {ipv4 | mac} port access-list <acl-name>**

Binds an ACL to the interface.  
 The no form of the command unbinds the ACL from the interface.

|                           |                                                                                                                    |                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Syntax Description</b> | ipv4   mac                                                                                                         | IPv4 or MAC – access list.                 |
|                           | acl-name                                                                                                           | ACL name.                                  |
| <b>Default</b>            | No ACL is bind by default.                                                                                         |                                            |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                   |                                            |
| <b>History</b>            | 3.1.1400                                                                                                           |                                            |
|                           | 3.3.4500                                                                                                           | Added MLAG port-channel configuration mode |
| <b>Role</b>               | admin                                                                                                              |                                            |
| <b>Example</b>            | switch (config interface ethernet 1/1) # mac port access-group my-list<br>switch (config interface ethernet 1/1) # |                                            |
| <b>Related Commands</b>   | ipv4/mac access-list                                                                                               |                                            |
| <b>Note</b>               | The access control list should be defined prior to the binding action.                                             |                                            |

## deny/permit (MAC ACL rule)

**[seq-number <sequence-number>] {deny|permit} {any | <source-mac> [mask <mac>]} {any |<destination-mac> [mask <mac>]} [protocol <protocol>] [cos <cos-value>] [vlan <vlan-id> | vlan-mask <vlan-mask>] [action <action-id>]  
no <sequence-number>**

Creates a rule for MAC ACL.

The no form of the command deletes a rule from the MAC ACL.

|                           |                                                                                                                                                                                    |                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sequence-number                                                                                                                                                                    | Optional parameter to set a specific sequence number for the rule. The range is:1-500.                                               |
|                           | deny   permit                                                                                                                                                                      | Determines the type of the rule, denies or permits action.                                                                           |
|                           | {any   <source-mac> [mask <mac>]}                                                                                                                                                  | Sets source MAC and optionally sets a mask for that MAC. The “any” option will cause the rule not to check the source MAC.           |
|                           | {any   <destination-mac> [mask <mac>]}                                                                                                                                             | Sets destination MAC and optionally sets a mask for that MAC. The “any” option will cause the rule not to check the destination MAC. |
|                           | protocol                                                                                                                                                                           | Sets the Ethertype field value from the MAC address. Possible range is: 0x0000-0xffff.                                               |
|                           | cos-value                                                                                                                                                                          | Sets the COS (priority bits) field, possible range is: 0-7.                                                                          |
|                           | vlan-id                                                                                                                                                                            | Sets the VLAN ID field, possible range is 0-4095.                                                                                    |
|                           | vlan-mask <vlan-mask>                                                                                                                                                              | Sets VLAN group. Range: 0x0000-0x0FFF.                                                                                               |
|                           | action                                                                                                                                                                             | Action name (free string).                                                                                                           |
| <b>Default</b>            | No rule is added by default to access control list.<br>Default sequence number is in multiple of 10.                                                                               |                                                                                                                                      |
| <b>Configuration Mode</b> | Config MAC ACL                                                                                                                                                                     |                                                                                                                                      |
| <b>History</b>            | 3.1.1400                                                                                                                                                                           |                                                                                                                                      |
|                           | 3.3.4500                                                                                                                                                                           | Added vlan-mask parameter                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                              |                                                                                                                                      |
| <b>Example</b>            | switch (config mac access-list my-list) # seq-number 10 deny<br>0a:0a:0a:0a:0a:0a mask ff:ff:ff:ff:ff:ff any vlan 6 cos 2 protocol 80<br>switch (config mac access-list my-list) # |                                                                                                                                      |
| <b>Related Commands</b>   | ipv4/mac access-list<br>ipv4/mac port access-group                                                                                                                                 |                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                                                                    |                                                                                                                                      |

## deny/permit (IPv4 ACL rule)

```
[seq-number <sequence-number>] {permit | deny} ip {<source-ip> [mask <ip>] |
[any]} {<dest-ip> [mask <ip>] | [any]} [action <action-id>]
no <sequence-number>
```

Creates a rule for IPv4 ACL.

The no form of the command deletes a rule from the IPv4 ACL.

|                           |                                                                                                                                                                            |                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sequence-number                                                                                                                                                            | Optional parameter to set a specific sequence number for the rule. The range is:1-500.                                                                                 |
|                           | deny   permit                                                                                                                                                              | Determines the type of the rule, deny or permit action. Valid mask values fall in the range 0-255.                                                                     |
|                           | {any   <source-ip> [mask <ip>]}                                                                                                                                            | Sets source IP and optionally sets a mask for that IP address. The “any” option causes the rule to not check the source IP. Valid mask values fall in the range 0-255. |
|                           | {any   <destination-ip> [mask <ip>]}                                                                                                                                       | Sets destination IP and optionally sets a mask for that MAC. The “any” option causes the rule to not check the destination MAC.                                        |
| <b>Default</b>            | No rule is added by default to access control list.<br>Default sequence number is in multiple of 10.                                                                       |                                                                                                                                                                        |
| <b>Configuration Mode</b> | Config IPv4 ACL                                                                                                                                                            |                                                                                                                                                                        |
| <b>History</b>            | 3.1.1400                                                                                                                                                                   | First version                                                                                                                                                          |
|                           | 3.3.4302                                                                                                                                                                   | Updated syntax description of mask <ip> parameter                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                      |                                                                                                                                                                        |
| <b>Example</b>            | switch (config ipv4 access-list my-list) # seq-number 51 deny ip 1.1.1.1<br>mask 123.12.13.53 45.45.45.0 mask 123.132.21.123<br>switch (config ipv4 access-list my-list) # |                                                                                                                                                                        |
| <b>Related Commands</b>   | ipv4/mac access-list<br>ipv4/mac port access-group                                                                                                                         |                                                                                                                                                                        |
| <b>Note</b>               |                                                                                                                                                                            |                                                                                                                                                                        |

## deny/permit (IPv4 TCP/UDP ACL rule)

```
[seq-number <sequence-number>] {permit | deny} {tcp | udp} {<source-ip>
[mask <ip>] | [any]} {<dest-ip> [mask <ip>] | [any]} [eq-source <port-number>]
[eq-destination <port-number>] [action <action-id>]
no <sequence-number>
```

Creates a rule for IPv4 UDP/TCP ACL.

The no form of the command deletes a rule from the ACL.

|                           |                                                                                                                                           |                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | sequence-number                                                                                                                           | Optional parameter to set a specific sequence number for the rule. The range is:1-500.                                              |
|                           | deny   permit                                                                                                                             | Determines the type of the rule, deny or permit action.                                                                             |
|                           | tcp   udp                                                                                                                                 | UDP or TCP rule transport type.                                                                                                     |
|                           | {any   <source-ip> [mask <ip>]}                                                                                                           | Sets source IP and optionally sets a mask for that IP address. The “any” option will cause the rule not to check the source IP.     |
|                           | {any   <destination-ip> [mask <ip>]}                                                                                                      | Sets destination IP and optionally sets a mask for that MAC. The “any” option will cause the rule not to check the destination MAC. |
|                           | [eq-source <port-number>]                                                                                                                 | TCP/UDP source port number. Range is 0-65535.                                                                                       |
|                           | [eq-destination <port-number>]                                                                                                            | TCP/UDP destination port number. Range is 0-65535.                                                                                  |
| <b>Default</b>            | No rule is added by default to access control list.<br>Default sequence number is in multiple of 10.                                      |                                                                                                                                     |
| <b>Configuration Mode</b> | Config IPv4 ACL                                                                                                                           |                                                                                                                                     |
| <b>History</b>            | 3.1.1400                                                                                                                                  |                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                     |                                                                                                                                     |
| <b>Example</b>            | switch (config ipv4 access-list my-list) # seq-number 10 deny tcp any<br>any eq-source 1200<br>switch (config ipv4 access-list my-list) # |                                                                                                                                     |
| <b>Related Commands</b>   | ipv4/mac access-list<br>ipv4/mac port access-group                                                                                        |                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                           |                                                                                                                                     |

## access-list action

**access-list action <action-profile-name>**  
**no access-list action <action-profile-name>**

Creates access-list action profile and entering the action profile configuration mode.  
 The no form of the command deletes the action profile.

|                           |                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | action-profile-name      given name for the profile.                                                                                                                                                                                                                                                                                          |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config)# access-list action my-action switch (config access-list action my-action)# show access-list action my-action Access-list Action my-action Mapped_Vlan_ID  Mapped_port  Counter_set  Policer_ID   ===== N/A            N/A            N/A            N/A             switch (config access-list action my-action)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                               |

## vlan-map

**vlan-map <vlan-id>**

**no vlan-map**

Adds action to map a new VLAN to the packet (in the ingress port or VLAN).  
The no form of the command removes the action to map a new VLAN.

|                           |                                                                                                                                                                                                                                                                                                                                                          |         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Syntax Description</b> | vlan-id                                                                                                                                                                                                                                                                                                                                                  | 0-4095. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                      |         |
| <b>Configuration Mode</b> | Config ACL Action                                                                                                                                                                                                                                                                                                                                        |         |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                 |         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                    |         |
| <b>Example</b>            | <pre>switch (config access-list action my-action)# vlan-map 10 switch (config access-list action my-action)# show access-list action my-action Access-list Action my-action Mapped_Vlan_ID  Mapped_port  Counter_set  Policer_ID   ===== 10               N/A           N/A           N/A            switch (config access-list action my-action)#</pre> |         |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                          |         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                          |         |



## show access-list action

**show access-list action {<action-profile-name> | summary}**

Displays the access-list action profiles summary.

|                           |                                                                                                                                                                                                                                        |                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Syntax Description</b> | action-profile-name                                                                                                                                                                                                                    | Filter the table according to the action profile name. |
|                           | summary                                                                                                                                                                                                                                | Display summary of the action list.                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                    |                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                       |                                                        |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                               |                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                  |                                                        |
| <b>Example</b>            | <pre> switch (config)# show access-list action my-action Access-list Action my-action Mapped_Vlan_ID  Mapped_port  Counter_set  Policer_ID   ===== 10               N/A           N/A           N/A            switch (config)# </pre> |                                                        |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                        |                                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                        |                                                        |

## show mac/ipv4 access-lists

**show [mac |ipv4 |] access-lists <access-list-name>**

Displays the list of rules for the MAC/IPv4 ACL.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>Syntax Description</b> | ipv4   mac                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | IPv4 or MAC - access list. |
|                           | access-list-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ACL name.                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Updated output             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |
| <b>Example</b>            | <pre>switch (config mac access-list my-list) # show mac access-lists my-list mac access-list my-list seq-number p/d   smac  dmac  protocol cos   vlan  vlan-mask action  ===== 10           deny  any   any   0800    3     3     0x0FFF   none    20           deny  any   any   80      2     6     0x0000   none    30           deny  any   any   any     any   any   0x0ACB   none    40           deny  any   any   any     any   any   N/A      none    switch (config mac access-list my-list) #</pre> |                            |
| <b>Related Commands</b>   | deny/permit (MAC ACL rule)<br>deny/permit (IPv4 ACL rule)<br>deny/permit (IPv4 TCP/UDP ACL rule)<br>ipv4/mac access-list<br>ipv4/mac port access-group                                                                                                                                                                                                                                                                                                                                                         |                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |

## show mac/ipv4 access-lists summary

**show [mac |ipv4 ] access-lists summary**

Displays the summary of number of rules per ACL, and the interfaces attached.

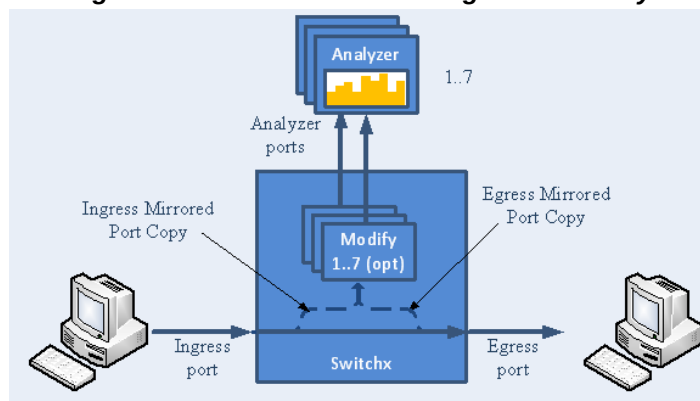
|                           |                                                                                                                                                                                               |                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | ipv4   mac                                                                                                                                                                                    | IPv4 or MAC - Access list |
|                           | access-list-name                                                                                                                                                                              | ACL name                  |
| <b>Default</b>            | N/A                                                                                                                                                                                           |                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                              |                           |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                      |                           |
| <b>Role</b>               | admin                                                                                                                                                                                         |                           |
| <b>Example</b>            | <pre>switch (config) # show mac access-lists summary mac access-list my-list   Total ACEs Configured: 2   Configured on interfaces:     Ethernet 1/1     Ethernet 1/2 switch (config) #</pre> |                           |
| <b>Related Commands</b>   | <pre>deny/permit (MAC ACL rule) deny/permit (IPv4 ACL rule) deny/permit (IPv4 TCP/UDP ACL rule) ipv4/mac access-list ipv4/mac port access-group</pre>                                         |                           |
| <b>Note</b>               |                                                                                                                                                                                               |                           |

## 5.12 Port Mirroring

Port mirroring enables data plane monitoring functionality which allows the user to send an entire traffic stream for testing. Port mirroring sends a copy of packets of a port's traffic stream, called "mirrored port", into an analyzer port. Port mirroring is used for network monitoring. It can be used for intrusion detection, security breaches, latency analysis, capacity and performance matters, and protocol analysis.

Figure 23 provides an overview of the mirroring functionality.

**Figure 23: Overview of Mirroring Functionality**

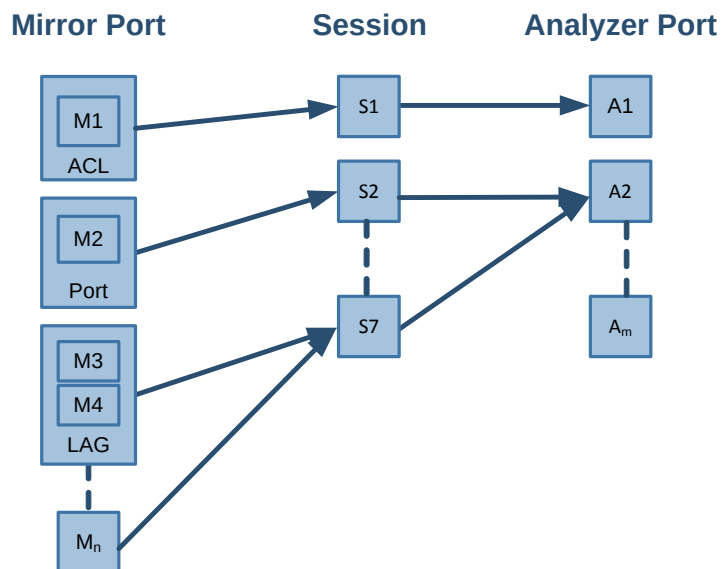


There is no limitation on the number of mirroring sources and more than a single source can be mapped to a single analyzer destination.

### 5.12.1 Mirroring Sessions

Port mirroring is performed by configuring mirroring sessions. A session is an association of a mirror port (or more) and an analyzer port.

**Figure 24: Mirror to Analyzer Mapping**



A mirroring session is a monitoring configuration mode that has the following parameters:

**Table 52 - Mirroring Parameters**

| Parameter             | Description                                                                  | Access |
|-----------------------|------------------------------------------------------------------------------|--------|
| Source interface(s)   | List of source interfaces to be mirrored.                                    | RW     |
| Destination interface | A single analyzer port through which all mirrored traffic egress.            | RW     |
| Header format         | The format and encapsulation of the mirrored traffic when sent to analyzer.  | RW     |
| Truncation            | Enabling truncation segments each mirrored packet to 64 bytes.               | RW     |
| Congestion control    | Controls the behavior of the source port when destination port is congested. | RW     |
| Admin state           | Administrative state of the monitoring session.                              | RW     |

### 5.12.1.1 Source Interface

The source interface (mirror port) refers to the interface from which the traffic is monitored. Port mirroring does not affect the switching of the original traffic. The traffic is simply duplicated and sent to the analyzer port. Traffic in any direction (either ingress, egress or both) can be mirrored.

There is no limitation on the number of the source interfaces mapped to a mirroring session.



Ingress and egress traffic flows of a specific source interface can be mapped to two different sessions.

### LAG

The source interface can be a physical interface or a LAG.

Port mirroring can be configured on a LAG interface but not on a LAG member. When a port is added to a mirrored LAG it inherits the LAG's mirror configuration. However, if port mirroring configuration is set on a port, that configuration must be removed prior to adding the port to a LAG interface.

When a port is removed from a LAG, the mirror property is switched off for that port.

### Control Protocols

All control protocols captured on the mirror port are forwarded to the analyzer port in addition to their normal treatment. For example LACP, STP, and LLDP are forwarded to the analyzer port in addition to their normal treatment by the CPU.

Exceptions to the behavior above are the packets that are being handled by the MAC layer, such as pause frames.

### 5.12.1.2 Destination Interface

The destination interface is an analyzer port is one to which mirrored traffic is sent. The mirrored packets, are duplicated, optionally modified and sent to the analyzer port. The SwitchX® platform supports up to 7 analyzer ports where any mirror port can be mapped to any analyzer port and more than a single mirror port can be mapped to a single analyzer port.

Packets can be forwarded to any destination using the command `destination interface`.  
The analyzer port supports status and statistics as any other port.

## LAG

The destination interface cannot be a member of LAG when the header format is local.

## Control Protocols

The destination interface may also operate in part as a standard port, receiving and sending out non-mirrored traffic. When the header format is configured as a local port, ingress control protocol packets that are received by the local analyzer port get discarded.

## Advanced MTU Considerations

The analyzer port, like its counterparts, is subject to MTU configuration. It does not send packets longer than configured.

When the analyzer port sends encapsulated traffic, the analyzer traffic has additional headers and therefore longer frame. The MTU must be configured to support the additional length, otherwise, the packet is truncated to the configured MTU.

The system on the receiving end of the analyzer port must be set to handle the egress traffic. If it is not, it might discard it and indicate this in its statistics (packet too long).

### 5.12.1.3 Header Format

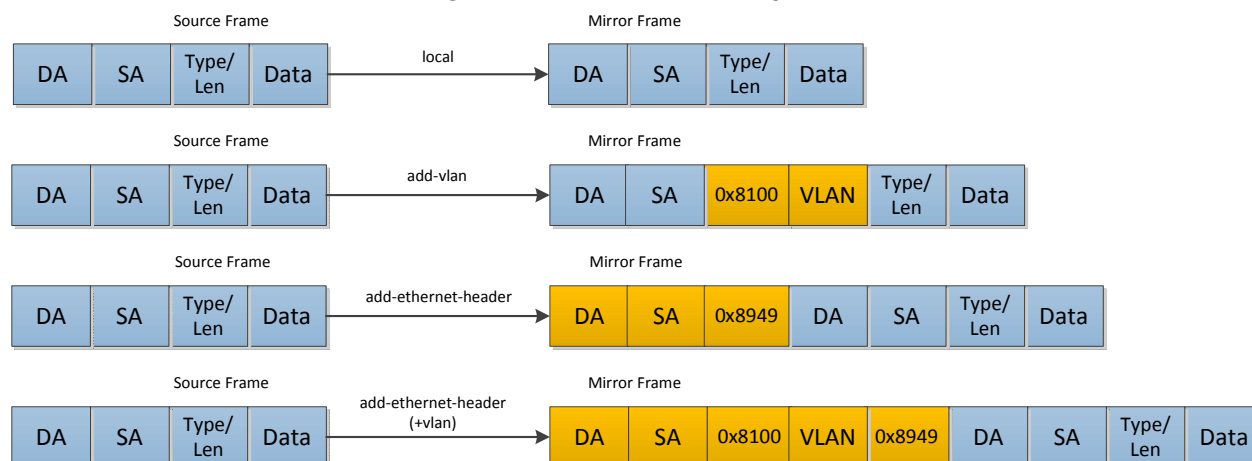
Ingress traffic from the source interface can be manipulated in several ways depending on the network layout using the command `header -format`.

If the analyzer system is directly connected to the destination interface, then the only parameters that can be configured on the port are the MTU, speed and port based flow control. Priority flow control is not supported in this case. However, if the analyzer system is indirectly connected to the destination interface, there are two options for switching the mirrored data to the analyzer system:

- A VLAN tag may be added to the Ethernet header of the mirrored traffic
- An Ethernet header can be added with include a new destination address and VLAN tag



It must be taken into account that adding headers increases packet size.

**Figure 25: Header Format Options**

#### 5.12.1.4 Congestion Control

The destination ports might receive pause frames that lead to congestion in the switch port. In addition, too much traffic directed to the analyzer port (for example 40GbE mirror port is directed into 10G analyzer port) might also lead to congestion.

In case of congestion:

- When best effort mode is enabled on the analyzer port, SwitchX drops excessive traffic headed to the analyzer port using tail drop mechanism, however, the regular data (mirrored data heading to its original port) does not suffer from a delay or drops due to the analyzer port congestion.
- When the best effort mode on the analyzer port is disabled, the SwitchX does not drop the excessive traffic. This might lead to buffer exhaustion and data path packet loss.

The default behavior in congestion situations is to drop any excessive frames that may clog the system.



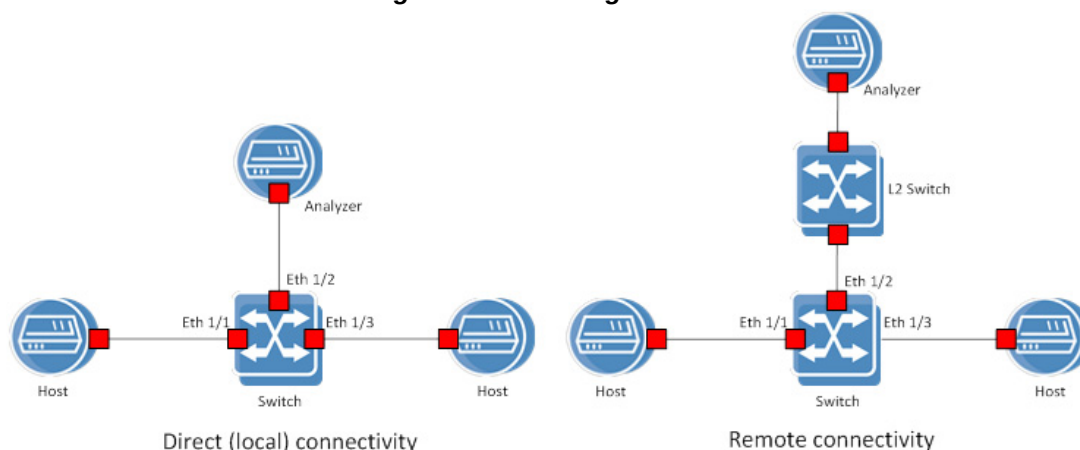
ETS, PFC and FC configurations do not apply to the destination port.

#### 5.12.1.5 Truncation

When enabled, the system can truncate the mirrored packets into smaller 64-byte packets (default) which is enough to capture the packets' L2 and L3 headers.

### 5.12.2 Configuring Mirroring Sessions

Figure 26 presents two network scenarios with direct and remote connectivity to the analyzer equipment. Direct connectivity is when the analyzer is connected to the analyzer port of the switch. In this case there is no need for adding an L2 header to the mirrored traffic. Remote connectivity is when the analyzer is indirectly connected to the analyzer port of the switch. In this situation, adding an L2 header may be necessary depending on the network's setup.

**Figure 26: Mirroring Session**

➤ **To configure a mirroring session:**

**Step 1.** Create a session. Run:

```
switch (config) # monitor session 1
```



This command enters a monitor session configuration mode. Upon first implementation the command also creates the session.

**Step 2.** Add source interface(s). Run:

```
switch (config monitor session 1) # add source interface ethernet 1/1 direction both
```

**Step 3.** Add destination interface. Run:

```
switch (config monitor session 1) # destination interface ethernet 1/2
```

**Step 4.** (Optional) Set header format. Run:

```
switch (config monitor session 1) # header-format add-ethernet-header destination-mac
00:0d:ec:f1:a9:c8 add-vlan 10 priority 5 traffic-class 2
```



For remote connectivity use the header formats add-vlan or add-ethernet-header. For local connectivity, use local.

**Step 5.** (Optional) Truncate the mirrored traffic to 64-byte packets. Run:

```
switch (config monitor session 1) # truncate
```

**Step 6.** (Optional) Set congestion control. Run:

```
switch (config monitor session 1) # congestion pause-excessive-frames
```



The default for this command is to drop excessive frames. The pause-excessive-frames option uses flow control to regulate the traffic from the source interfaces.





If the option `pause-excessive-frame` is selected, make sure that flow control is enabled on **all** source interfaces on the ingress direction of the monitoring session using the command `flowcontrol` in the interface configuration mode.

**Step 7.** Enable the session. Run:

```
switch (config monitor session 1) # no shutdown
```

### 5.12.3 Verifying Mirroring Sessions

➤ **To verify the attributes of a specific mirroring session:**

```
switch (config) # show monitor session 1
Admin: Enable
Status: Up
Truncate: Enable
Destination interface: eth1/2
Congestion type: pause-excessive-frames
Header format: add-ethernet-header
 - traffic class 2
 - vlan 10
 - priority 5
 - destination-mac 00:0d:ec:f1:a9:c8

Source interfaces
Interface direction

eth1/1 both
```

➤ **To verify the attributes of running mirroring sessions:**

```
switch (config) # show monitor session summary
```

| Session | Admin   | Status | Mode     | Destination | Source            |
|---------|---------|--------|----------|-------------|-------------------|
| 1       | Enable  | Up     | add-eth  | eth1/2      | eth1/1(b)         |
| 2       | Disable | Down   | add-vlan | eth1/2      | eth1/8(i), po1(e) |
| 3       | Enable  | Up     | add-eth  | eth1/5      | eth1/18(e)        |
| 7       | Disable | Down   | local    |             |                   |

5.12.4 Commands

5.12.4.1 Config

monitor session

**monitor session** <session-id>  
**no monitor session** <session-id>

Creates session and enters monitor session configuration mode upon using this command for the first time.  
The no form of the command deletes the session.

|                    |                                                                          |                                           |
|--------------------|--------------------------------------------------------------------------|-------------------------------------------|
| Syntax Description | session-id                                                               | The monitor session ID. The range is 1-7. |
| Default            | N/A                                                                      |                                           |
| Configuration Mode | Config                                                                   |                                           |
| History            | 3.3.3500                                                                 |                                           |
| Role               | admin                                                                    |                                           |
| Example            | switch (config)# monitor session 1<br>switch (config monitor session 1)# |                                           |
| Related Commands   |                                                                          |                                           |
| Note               |                                                                          |                                           |

## 5.12.4.2 Config Monitor Session

### destination interface

**destination interface** <type> <number> [force]  
**no destination interface**

Sets the egress interface number.  
 The no form of the command deletes the destination interface.

|                           |                                                                                                              |                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | interface <type> <number>                                                                                    | Sets the interface type and number (e.g. ethernet 1/2)           |
|                           | force                                                                                                        | The user does not need to shutdown the port prior the operation. |
| <b>Default</b>            | no destination interface                                                                                     |                                                                  |
| <b>Configuration Mode</b> | Config Monitor Session                                                                                       |                                                                  |
| <b>History</b>            | 3.3.3500                                                                                                     | First version                                                    |
|                           | 3.3.4100                                                                                                     | Added force argument                                             |
| <b>Role</b>               | admin                                                                                                        |                                                                  |
| <b>Example</b>            | switch (config monitor session 1) # destination interface ethernet 1/2<br>switch (config monitor session 1)# |                                                                  |
| <b>Related Commands</b>   |                                                                                                              |                                                                  |
| <b>Note</b>               |                                                                                                              |                                                                  |

## shutdown

**shutdown**  
**no shutdown**

Disables the session.  
 The no form of the command enables the session.

|                           |                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                   |
| <b>Default</b>            | Disabled                                                                              |
| <b>Configuration Mode</b> | Config Monitor Session                                                                |
| <b>History</b>            | 3.3.3500                                                                              |
| <b>Role</b>               | admin                                                                                 |
| <b>Example</b>            | switch (config monitor session 1) # no shutdown<br>switch (config monitor session 1)# |
| <b>Related Commands</b>   |                                                                                       |
| <b>Note</b>               |                                                                                       |

## add source interface

**add source interface** <type> <number> **direction** <d-type>

**no source interface** <type> <number>

Adds a source interface to the mirrored session.

The no form of the command deletes the source interface.

|                           |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | interface <type> <number>                                                                                                                                                    | Configures interface as “ethernet” or “port-channel”.                                                                                                                                                                                                                                                              |
|                           | direction <d-type>                                                                                                                                                           | Configures the direction of the mirrored traffic. The options are as follows: <ul style="list-style-type: none"> <li>• egress – sets the egress traffic to be monitored</li> <li>• ingress – sets the ingress traffic to be monitored</li> <li>• both – sets egress and ingress traffic to be monitored</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config Monitor Session                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.3.3500                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config monitor session 1) # add source interface ethernet 1/1 direction both switch (config monitor session 1)#</pre>                                           |                                                                                                                                                                                                                                                                                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | If mirroring is configured in one direction (e.g. ingress) on an interface and then is configured in the other direction (e.g. egress), then the ultimate setting is “both”. |                                                                                                                                                                                                                                                                                                                    |

## header-format

**header-format** {local [traffic-class <tc>] | add-vlan <vlan-id> [priority <prio>]  
[traffic-class <tc>] | add-ethernet-header destination-mac <mac-address> [add-  
vlan <vlan-id> [priority <prio>]] [traffic-class <tc>]}  
**no header-format**

Sets the header format of the mirrored traffic.

The no form of the command resets the parameter values back to default.

|                           |                                                                                                                                                                                            |                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | local                                                                                                                                                                                      | The mirrored header of the frame is not changed.               |
|                           | traffic-class <tc>                                                                                                                                                                         | Changes the egress traffic class of the frame. Range is 0-3.   |
|                           | add-vlan <vlan-id>                                                                                                                                                                         | An 802.1q VLAN tag is added to the frame.                      |
|                           | priority <prio>                                                                                                                                                                            | The priority to be added to the Ethernet header. Range is 0-7. |
|                           | add-ethernet-header                                                                                                                                                                        | Adds an Ethernet header to the mirrored frame.                 |
|                           | destination-mac                                                                                                                                                                            | The destination MAC address of the added Ethernet frame.       |
| <b>Default</b>            | no-change<br>vlan 1<br>priority 0<br>traffic-class 0                                                                                                                                       |                                                                |
| <b>Configuration Mode</b> | Config Monitor Session                                                                                                                                                                     |                                                                |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                   |                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                      |                                                                |
| <b>Example</b>            | switch (config monitor session 1) # header-format add-ethernet-header<br>destination-mac 00:0d:ec:f1:a9:c8 add-vlan 10 priority 5 traffic-class<br>2<br>switch (config monitor session 1)# |                                                                |
| <b>Related Commands</b>   |                                                                                                                                                                                            |                                                                |
| <b>Note</b>               | If add-ethernet-header is used, the source MAC address is the one attached to the switch.                                                                                                  |                                                                |

## truncate

**truncate**  
**no truncate**

Truncates the mirrored frames to 64-byte packets.  
 The no form of the command disables truncation.

|                           |                                                                                    |
|---------------------------|------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                |
| <b>Default</b>            | no truncate                                                                        |
| <b>Configuration Mode</b> | Config Monitor Session                                                             |
| <b>History</b>            | 3.3.3500                                                                           |
| <b>Role</b>               | admin                                                                              |
| <b>Example</b>            | switch (config monitor session 1) # truncate<br>switch (config monitor session 1)# |
| <b>Related Commands</b>   |                                                                                    |
| <b>Note</b>               | This command applies for all sessions on the same analyzer port.                   |

## congestion

**congestion [drop-excessive-frames | pause-excessive-frames]**  
**no congestion**

Sets the system's behavior when congested  
 The no form of the command disables truncation.

|                           |                                                                                                                     |                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | drop-excessive-frames                                                                                               | Drops excessive frames.   |
|                           | pause-excessive-frames                                                                                              | Pauses excessive frames.  |
| <b>Default</b>            | drop-excessive-frames                                                                                               |                           |
| <b>Configuration Mode</b> | Config Monitor Session                                                                                              |                           |
| <b>History</b>            | 3.3.3500                                                                                                            |                           |
|                           | 3.3.4000                                                                                                            | Added Syntax Description. |
| <b>Role</b>               | admin                                                                                                               |                           |
| <b>Example</b>            | <pre>switch (config monitor session 1) # congestion pause-excessive-frames switch (config monitor session 1)#</pre> |                           |
| <b>Related Commands</b>   |                                                                                                                     |                           |
| <b>Note</b>               | This command applies for all sessions on the same analyzer port.                                                    |                           |



### 5.12.4.3 Show

## show monitor session

**show monitor session** <session-id>

Displays monitor session configuration and status.

| Syntax Description | session-id                                                                                                                                                                                                                                                                                                                                                    | The monitor session ID. Range is 1-7. |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                           |                                       |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                              |                                       |
| History            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                      |                                       |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                         |                                       |
| Example            | <pre>switch (config) # show monitor session 1 Admin: Enable Status: Up Truncate: Enable Destination interface: eth1/2 Congestion type: pause-excessive-frames Header format: add-ethernet-header - traffic class 2 - vlan 10 - priority 5 - destination-mac 00:0d:ec:f1:a9:c8 Source interfaces Interface direction ----- eth1/1 both switch (config) #</pre> |                                       |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                               |                                       |
| Note               |                                                                                                                                                                                                                                                                                                                                                               |                                       |

## show monitor session summary

### show monitor session summary

Displays monitor session configuration and status summary.

|                           |                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # show monitor session summary Session    Admin    Status  Mode      Destination  Source 1           Enable   Up       add-eth   eth1/2       eth1/1(b) 2           Disable Down     add-vlan  eth1/2       eth1/8(i), po1(e) 3           Enable   Up       add-eth   eth1/5       eth1/18(e) 7           Disable Down     local switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                               |

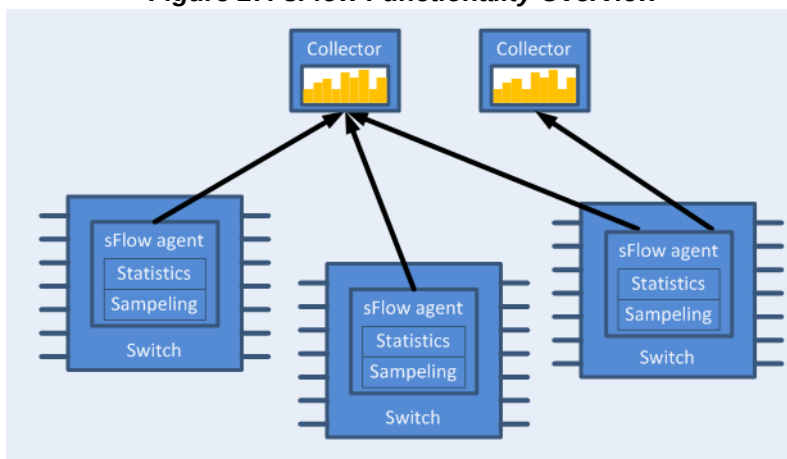
## 5.13 sFlow

sFlow (ver. 5) is a procedure for statistical monitoring of traffic in networks. MLNX-OS supports an sFlow sampling mechanism (agent), which includes collecting traffic samples and data from counters. The sFlow datagrams are then sent to a central collector.

The sampling mechanism must ensure that any packet going into the system has an equal chance of being sampled, irrespective of the flow to which it belongs. The sampling mechanism provides the collector with periodical information on the amount (and load) of traffic per interface by loading the counter samples into sFlow datagrams.

The sFlow packets are encapsulated and sent in UDP over IP. The UDP port number that is used is the standard 6343 by default.

**Figure 27: sFlow Functionality Overview**



### 5.13.1 Flow Samples

The sFlow agent samples the data path based on packets.

Truncation and sampling rate are the two parameters that influence the flow samples. In case of congestion the flow samples can be truncated to a predefined size before it is assigned to the CPU. The truncation can be set to any value between 64 to 256 bytes with the default being 128 bytes.

The sampling rate can be adjusted by setting an average rate. The system assures that a random number of packets is sampled, however, the sample rate on average converges to the configured rate. Valid values range between 4000 to 16777215 packets.

### 5.13.2 Statistical Samples

The sFlow agent samples interface counters time based. Polling interval is configurable to any value between 5-3600 seconds with the default being 20 seconds.

The following statistics are gathered by the CPU:

**Table 53 - List of Statistical Counters**

| Counter       | Description                                                  |
|---------------|--------------------------------------------------------------|
| Total packets | The number of packets that pass through sFlow-enabled ports. |

**Table 53 - List of Statistical Counters**

| Counter                     | Description                                                        |
|-----------------------------|--------------------------------------------------------------------|
| Number of flow samples      | The number of packets that are captured by the sampling mechanism. |
| Number of statistic samples | The number of statistical samples.                                 |
| Number of discarded samples | The number of samples that were discarded.                         |
| Number of datagrams         | The number of datagrams that were sent to the collector.           |

### 5.13.3 sFlow Datagrams

The sFlow datagrams contain flow samples and statistical samples.

The sFlow mechanism uses IP protocol, therefore if the packet length is more than the interface MTU, it becomes fragmented by the IP stack. The MTU may also be set manually to anything in the range of 200-9216 bytes. The default is 1400 bytes.

### 5.13.4 Sampled Interfaces

sFlow must be enabled on physical or LAG interfaces that require sampling. When adding a port to a LAG, sFlow must be disabled on the port. If a port with enabled sFlow is configured to be added to a LAG, the configuration is rejected. Removing a port from a LAG disables sFlow on the port regardless of the LAG's sFlow status.

### 5.13.5 Configuring sFlow

➤ *To configure the sFlow agent:*

**Step 1.** Unlock the sFlow commands. Run:

```
switch (config) # protocol sflow
```

**Step 2.** Enable sFlow on the system. Run:

```
switch (config) # sflow enable
```

**Step 3.** Enter sFlow configuration mode. Run:

```
switch (config) # sflow
switch (config sflow) #
```

**Step 4.** Set the central collector's IP. Run:

```
switch (config sflow) # collector-ip 10.10.10.10
```

**Step 5.** Set the agent-ip used in the sFlow header. Run:

```
switch (config sflow) # agent-ip 20.20.20.20
```

**Step 6.** (Optional) Set the sampling rate of the mechanism. Run:

```
switch (config sflow) # sampling-rate 16000
```



This means that one every 16000 packet gets collected for sampling.

**Step 7.** (Optional) Set the maximum size of the data path sample. Run:

```
switch (config sflow) # max-sample-size 156
```

**Step 8.** (Optional) Set the frequency in which counters are polled. Run:

```
switch (config sflow) # counter-poll-interval 19
```

**Step 9.** (Optional) Set the maximum size of the datagrams sent to the central collector. Run:

```
switch (config sflow) # max-datagram-size 1500
```

**Step 10.** Enable the sFlow agent on the desired interfaces. Run:

```
switch (config interface ethernet 1/1)# sflow enable
switch (config interface port-channel 1)# sflow enable
```

### 5.13.6 Verifying sFlow

➤ *To verify the attributes of the sFlow agent:*

```
switch (config)# show sflow

sflow protocol enabled
sflow enabled
sampling-rate 16000
max-sampled-size 156
counter-poll-interval 19
max-datagram-size 1500
collector-ip 10.10.10.10
collector-port 6343
agent-ip 20.20.20.20

Interfaces
Ethernet: eth1/1
Port-channel: po1

Statistics:
Total Packets: 2000
Number of flow samples: 1200
Number of samples discarded: 0
Number of statistic samples: 800
Number of datagrams: 300
```

## 5.13.7 Commands

### 5.13.7.1 Config

#### protocol sflow

**protocol sflow**  
**no protocol sflow**

Unhides the sFlow commands.  
The no form of the command deletes sFlow configuration and hides the sFlow commands.

|                           |                                                       |
|---------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                   |
| <b>Default</b>            | Disabled                                              |
| <b>Configuration Mode</b> | Config                                                |
| <b>History</b>            | 3.3.3500                                              |
| <b>Role</b>               | admin                                                 |
| <b>Example</b>            | switch (config) # protocol sflow<br>switch (config) # |
| <b>Related Commands</b>   |                                                       |
| <b>Note</b>               |                                                       |

## **sflow enable (global)**

**sflow enable**  
**no sflow enable**

Enables sFlow in the system.  
The no form of the command disables sFlow without deleting the configuration.

|                           |                                                     |
|---------------------------|-----------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                 |
| <b>Default</b>            | Disabled                                            |
| <b>Configuration Mode</b> | Config                                              |
| <b>History</b>            | 3.3.3500                                            |
| <b>Role</b>               | admin                                               |
| <b>Example</b>            | switch (config) # sflow enable<br>switch (config) # |
| <b>Related Commands</b>   |                                                     |
| <b>Note</b>               |                                                     |

## sflow

### sflow

Enters sFlow configuration mode.

|                           |                                                    |
|---------------------------|----------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                |
| <b>Default</b>            | N/A                                                |
| <b>Configuration Mode</b> | Config                                             |
| <b>History</b>            | 3.3.3500                                           |
| <b>Role</b>               | admin                                              |
| <b>Example</b>            | switch (config) # sflow<br>switch (config sflow) # |
| <b>Related Commands</b>   |                                                    |
| <b>Note</b>               |                                                    |



### 5.13.7.2 Config sFlow

#### sampling-rate

**sampling-rate <rate>**  
**no sampling-rate**

Sets sFlow sampling ratio.  
 The no form of the command resets this parameter to its default value.

|                           |                                                                                |                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | rate                                                                           | Sets the number of packets passed before selecting one for sampling. The range is 4000-16777215. Zero disables sampling. |
| <b>Default</b>            | 16000                                                                          |                                                                                                                          |
| <b>Configuration Mode</b> | Config sFlow                                                                   |                                                                                                                          |
| <b>History</b>            | 3.3.3500                                                                       |                                                                                                                          |
| <b>Role</b>               | admin                                                                          |                                                                                                                          |
| <b>Example</b>            | <pre>switch (config sflow) # sampling-rate 16111 switch (config sflow) #</pre> |                                                                                                                          |
| <b>Related Commands</b>   |                                                                                |                                                                                                                          |
| <b>Note</b>               |                                                                                |                                                                                                                          |

## max-sample-size

**max-sample-size** <packet-size>

**no max-sample-size**

Sets the maximum size of sampled packets by sFlow.

The no form of the command resets the parameter to its default value.

|                           |                                                                                |                                                     |
|---------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Syntax Description</b> | packet-size                                                                    | The sampled packet size. The range is 64-256 bytes. |
| <b>Default</b>            | 128 bytes                                                                      |                                                     |
| <b>Configuration Mode</b> | Config sFlow                                                                   |                                                     |
| <b>History</b>            | 3.3.3500                                                                       |                                                     |
| <b>Role</b>               | admin                                                                          |                                                     |
| <b>Example</b>            | <pre>switch (config sflow) # max-sample-size 165 switch (config sflow) #</pre> |                                                     |
| <b>Related Commands</b>   |                                                                                |                                                     |
| <b>Note</b>               | Sampled payload beyond the configured size is discarded.                       |                                                     |

## counter-poll-interval

**counter-poll-interval <seconds>**

**no counter-poll-interval**

Sets the sFlow statistics polling interval.

The no form of the command resets the parameter to its default value.

|                           |                                                                             |                                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | seconds                                                                     | The sFlow statistics polling interval in seconds. Range is 5-3600 seconds. Zero disables the statistic polling. |
| <b>Default</b>            | 20 seconds                                                                  |                                                                                                                 |
| <b>Configuration Mode</b> | Config sFlow                                                                |                                                                                                                 |
| <b>History</b>            | 3.3.3500                                                                    |                                                                                                                 |
| <b>Role</b>               | admin                                                                       |                                                                                                                 |
| <b>Example</b>            | switch (config sflow) # counter-poll-interval 30<br>switch (config sflow) # |                                                                                                                 |
| <b>Related Commands</b>   |                                                                             |                                                                                                                 |
| <b>Note</b>               |                                                                             |                                                                                                                 |

## max-datagram-size

**max-datagram-size** <packet-size>

**no max-datagram-size**

Sets the maximum sFlow packet size to be sent to the collector.  
The no form of the command resets the parameter to its default value.

|                           |                                                                               |                                                                                            |
|---------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | packet-size                                                                   | The packet size of the packet being sent to the collector.<br>The range is 200-9216 bytes. |
| <b>Default</b>            | 1400 bytes                                                                    |                                                                                            |
| <b>Configuration Mode</b> | Config sFlow                                                                  |                                                                                            |
| <b>History</b>            | 3.3.3500                                                                      |                                                                                            |
| <b>Role</b>               | admin                                                                         |                                                                                            |
| <b>Example</b>            | switch (config sflow) # max-datagram-size 9216<br>switch (config sflow) #     |                                                                                            |
| <b>Related Commands</b>   |                                                                               |                                                                                            |
| <b>Note</b>               | This packet contains the data sample as well as the statistical counter data. |                                                                                            |

## collector-ip

**collector-ip** <ip-address> [udp-port <udp-port-number>]  
**no collector-ip** [<ip-address> udp-port]

Sets the collector's IP.

The no form of the command resets the parameters to their default values.

|                           |                                                                             |                                     |
|---------------------------|-----------------------------------------------------------------------------|-------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                  | The collector IP address.           |
|                           | udp-port <udp-port-number>                                                  | Sets the collector UDP port number. |
| <b>Default</b>            | ip-address: 0.0.0.0<br>udp-port-number: 6343                                |                                     |
| <b>Configuration Mode</b> | Config sFlow                                                                |                                     |
| <b>History</b>            | 3.3.3500                                                                    |                                     |
| <b>Role</b>               | admin                                                                       |                                     |
| <b>Example</b>            | switch (config sflow) # collector-ip 10.10.10.10<br>switch (config sflow) # |                                     |
| <b>Related Commands</b>   |                                                                             |                                     |
| <b>Note</b>               |                                                                             |                                     |

## agent-ip

**agent-ip** {<ip-address> | **interface** [ethernet <slot/port> | port-channel <channel-group>] | <if-name> | **loopback** <number> | **vlan** <id>}  
**no agent-ip**

Sets the IP address associated with this agent.

The no form of the command resets the parameters to their default values.

|                           |                                                                                 |                                                                   |
|---------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | interface                                                                       | Configures a specific ethernet/port-channel interface's agent IP. |
|                           | if-name                                                                         | Interface name (e.g. mgmt0, mgmt1).                               |
|                           | ip-address                                                                      | The sFlow agent's IP address (i.e. the source IP of the packet).  |
|                           | loopback <number>                                                               | Loopback interface number. Range: 1-32.                           |
|                           | vlan <id>                                                                       | Interface VLAN. Range: 1-4094.                                    |
| <b>Default</b>            | ip-address: 0.0.0.0                                                             |                                                                   |
| <b>Configuration Mode</b> | Config sFlow                                                                    |                                                                   |
| <b>History</b>            | 3.3.3500                                                                        |                                                                   |
|                           | 3.3.5200                                                                        | Updated "interface" parameters                                    |
| <b>Role</b>               | admin                                                                           |                                                                   |
| <b>Example</b>            | <pre>switch (config sflow) # agent-ip 20.20.20.20 switch (config sflow) #</pre> |                                                                   |
| <b>Related Commands</b>   |                                                                                 |                                                                   |
| <b>Note</b>               | The IP address here is used in the sFlow header.                                |                                                                   |

## clear counters

### clear counters

Clears sFlow counters.

|                           |                                                                   |
|---------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                               |
| <b>Default</b>            | N/A                                                               |
| <b>Configuration Mode</b> | Config sFlow                                                      |
| <b>History</b>            | 3.3.3500                                                          |
| <b>Role</b>               | admin                                                             |
| <b>Example</b>            | switch (config sflow) # clear counters<br>switch (config sflow) # |
| <b>Related Commands</b>   |                                                                   |
| <b>Note</b>               |                                                                   |

## sflow enable (interface)

**sflow enable**  
**no sflow enable**

Enables sFlow on this interface.  
 The no form of the command disables sFlow on the interface.

|                           |                                                                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                 |
| <b>Default</b>            | disable<br>no view-port-channel member                                                                              |
| <b>Configuration Mode</b> | Config Interface Ethernet<br>Config Interface Port Channel<br>Config Interface MLAG Port Channel                    |
| <b>History</b>            | 3.3.3500<br><br>3.3.4500 Added MLAG port-channel configuration mode                                                 |
| <b>Role</b>               | admin                                                                                                               |
| <b>Example</b>            | switch(config interface ethernet 1/1)# sflow enable<br>...<br>switch(config interface port-channel 1)# sflow enable |
| <b>Related Commands</b>   |                                                                                                                     |
| <b>Note</b>               |                                                                                                                     |



### 5.13.7.3 Show

## show sflow

### show sflow

Displays sFlow configuration and counters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config)# show sflow sflow protocol enabled sflow enabled sampling-rate 16000 max-sampled-size 156 counter-poll-interval 19 max-datagram-size 1500 collector-ip 10.10.10.10 collector-port 6343 agent-ip 20.20.20.20 Interfaces Ethernet: eth1/1 Port-channel: po1 Statistics: Total Packets: 2000 Number of flow samples: 1200 Number of samples discarded: 0 Number of statistic samples: 800 Number of datagrams: 300</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## 5.14 Transport Applications

### 5.14.1 RDMA over Converged Ethernet (RoCE)

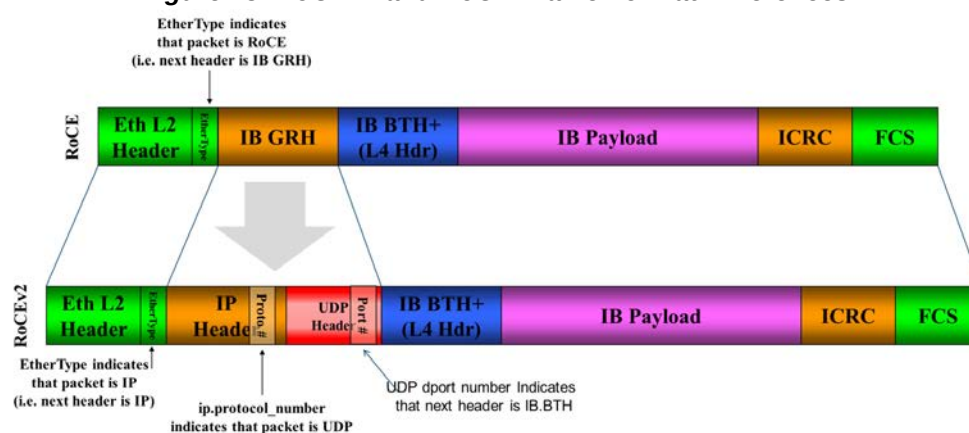
#### 5.14.1.1 RoCE Overview

Remote Direct Memory Access (RDMA) is the remote memory management capability that allows server to server data movement directly between application memory without any CPU involvement. RDMA over Converged Ethernet (RoCE) is a mechanism to provide this efficient data transfer with very low latencies on loss-less Ethernet networks. With advances in data center convergence over reliable Ethernet, ConnectX® EN with RoCE uses the proven and efficient RDMA transport to provide the platform for deploying RDMA technology in mainstream data center application at 10GigE and 40GigE link-speed. ConnectX® EN with its hardware offload support takes advantage of this efficient RDMA transport (InfiniBand) services over Ethernet to deliver ultra-low latency for performance-critical and transaction intensive applications such as financial, database, storage, and content delivery networks. RoCE encapsulates IB transport and GRH headers in Ethernet packets bearing a dedicated ether type. While the use of GRH is optional within InfiniBand subnets, it is mandatory when using RoCE. Applications written over IB verbs should work seamlessly, but they require provisioning of GRH information when creating address vectors. The library and driver are modified to provide mapping from GID to MAC addresses required by the hardware.

##### 5.14.1.1.1 IP Routable (RoCEv2)

A straightforward extension of the RoCE protocol enables traffic to operate in layer 3 environments. This capability is obtained via a simple modification of the RoCE packet format. Instead of the GRH used in RoCE, routable RoCE packets carry an IP header which allows traversal of IP L3 Routers and a UDP header that serves as a stateless encapsulation layer for the RDMA Transport Protocol Packets over IP.

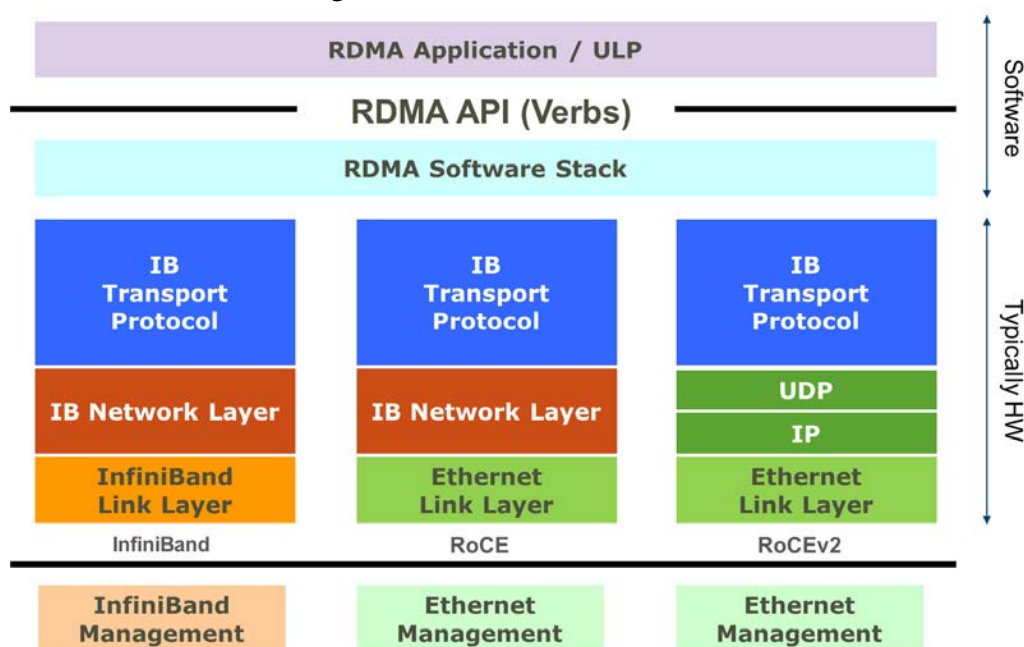
**Figure 28: RoCEv2 and RoCE Frame Format Differences**



The proposed RoCEv2 packets use a well-known UDP destination port value that unequivocally distinguishes the datagram. Similar to other protocols that use UDP encapsulation, the UDP source port field is used to carry an opaque flow-identifier that allows network devices to implement packet forwarding optimizations (e.g. ECMP) while staying agnostic to the specifics of the protocol header format.

Furthermore, since this change exclusively affects the packet format on the wire, and due to the fact that with RDMA semantics packets are generated and consumed below the AP applications can seamlessly operate over any form of RDMA service (including the routable version of RoCE as shown in Figure 2), in a completely transparent way<sup>1</sup>.

**Figure 29: RoCEv2 Protocol Stack**



#### 5.14.1.2 RoCE Configuration

In order to function reliably, RoCE requires a form of flow control. While it is possible to use global flow control, this is normally undesirable, for performance reasons.

The normal and optimal way to use RoCE is to use Priority Flow Control (PFC). To use PFC, it must be enabled on all endpoints and switches in the flow path.

In the following section we present instructions to configure PFC on Mellanox ConnectX™ cards. There are multiple configuration steps required, all of which may be performed via PowerShell. Therefore, although we present each step individually, you may ultimately choose to write a PowerShell script to do them all in one step. Note that administrator privileges are required for these steps.

For further information, please refer to the following URL:

<http://blogs.technet.com/b/josebda/archive/2012/07/31/deploying-windows-server-2012-with-smb-direct-smb-over-rdma-and-the-mellanox-connectx-3-using-10gbe-40gbe-roce-step-by-step.aspx>

##### 5.14.1.2.1 Prerequisites

The following are the driver's prerequisites in order to set or configure RoCE:

- ConnectX®-3 and ConnectX®-3 Pro firmware version 2.30.3000 or higher

1. Standard RDMA APIs are IP based already for all existing RDMA technologies

- All InfiniBand verbs applications which run over InfiniBand verbs should work on RoCE links if they use GRH headers.
- Set HCA to use Ethernet protocol:  
Display the Device Manager and expand “System Devices”.

#### 5.14.1.2.2 Configuring Windows Host



Since PFC is responsible for flow controlling at the granularity of traffic priority, it is necessary to assign different priorities to different types of network traffic. As per RoCE configuration, all ND/NDK traffic is assigned to one or more chosen priorities, where PFC is enabled on those priorities.

Configuring Windows host requires configuring QoS.

##### 5.14.1.2.2.1 Using Global Pause Flow Control (GFC)

- ***To use Global Pause Flow Control (GFC) mode, disable QoS and Priority:***

```
PS $ Disable-NetQosFlowControl
PS $ Disable-NetAdapterQos
```

#### 5.14.1.3 Configuring SwitchX® Based Switch System

- ***To enable RoCE, the SwitchX should be configured as follows:***
- Ports facing the host should be configured as access ports, and either use global pause or Port Control Protocol (PCP) for priority flow control
  - Ports facing the network should be configured as trunk ports, and use Port Control Protocol (PCP) for priority flow control

For further information on how to configure SwitchX, please refer to SwitchX User Manual.

#### 5.14.1.4 Configuring Router (PFC only)

The router uses L3's DSCP value to mark the egress traffic of L2 PCP. The required mapping, maps the three most significant bits of the DSCP into the PCP. This is the default behavior, and no additional configuration is required.

##### 5.14.1.4.1 Copying Port Control Protocol (PCP) Between Subnets

The captured PCP option from the Ethernet header of the incoming packet can be used to set the PCP bits on the outgoing Ethernet header.

#### 5.14.1.5 Configuring the RoCE Mode

Configuring the RoCE mode requires the following:

- RoCE mode is configured per-driver and is enforced on all the devices in the system



The supported RoCE modes depend on the firmware installed. If the firmware does not support the needed mode, the fallback mode would be the maximum supported RoCE mode of the installed NIC.

RoCE mode can be enabled and disabled via PowerShell.

➤ **To enable RoCE using the PowerShell:**

- Open the PowerShell and run:

```
Set-MlnxDriverCoreSetting -RocMode 1
```

➤ **To enable RoCEv2 using the PowerShell:**

- Open the PowerShell and run:

```
Set-MlnxDriverCoreSetting -RocMode 2
```

➤ **To disable any version of RoCE using the PowerShell:**

Open the PowerShell and run:

```
Set-MlnxDriverCoreSetting -RocMode 0
```

➤ **To check current version of RoCE using the PowerShell:**

**Step 1.** Open the PowerShell and run:

```
Get-MlnxDriverCoreSetting
```

**Step 2.** Example output:

```
Caption : DriverCoreSettingData 'mlx4_bus'
Description : Mellanox Driver Option Settings
.
.
.
RocMode : 0
```

## 6 IP Routing

### 6.1 General

#### 6.1.1 IP Interfaces

MLNX-OS supports 3 types of IP interfaces.

- VLAN interface
- Loopback interface
- Router ports



Router ports are not supported on SX10xx-xxxR and SX60xx-xxxR systems.

VLAN interface is a logical IPv4 interface created per subnet over a specific 802.1Q VLAN ID. If two hosts from two different subnets need to communicate (via the IP layer), the network administrator needs to configure two interface VLANs, one for each of the subnets. The user may configure up to 64 VLAN interfaces.

Each interface VLAN has the following attributes:

- Admin state
- Operational state
- MAC address
- IP address and mask
- MTU
- Description
- Set of counters

Loopback interface is a logical software entity where traffic transmitted to this interface is immediately received on the sending end.

Router port is a regular switch port configured to operate as an L3 interface. Router ports are assigned an IP address and all L3 commands become applicable to them.

Once configured, router ports no longer partake in the bridging activities of the switch and VLANs configured on them are separate from the pool allocated for the switch ports.

### 6.1.1.1 Commands

## switchport

**switchport [force]**  
**no switchport [force]**

Configures the Ethernet interface as a regular switchport.  
The no form of the command configures the Ethernet interface as a router port.

|                           |                                                              |                                                                      |
|---------------------------|--------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | force                                                        | Forces configuration even if the interface's admin state is enabled. |
| <b>Default</b>            | N/A                                                          |                                                                      |
| <b>Configuration Mode</b> | Config                                                       |                                                                      |
| <b>History</b>            | 3.3.5200                                                     |                                                                      |
| <b>Role</b>               | admin                                                        |                                                                      |
| <b>Example</b>            | switch (config interface ethernet 1/10)# no switchport force |                                                                      |
| <b>Related Commands</b>   |                                                              |                                                                      |
| <b>Note</b>               |                                                              |                                                                      |

## encapsulation dot1q vlan

**encapsulation dot1q vlan <vlan-id> [force]**

**no encapsulation dot1q vlan [force]**

Enables L2 802.1Q encapsulation of traffic on a specified router port in a VLAN.  
The no form of the command disables L2 802.1Q encapsulation of traffic on a specified router port in a VLAN.

|                           |                                                                      |                                                                        |
|---------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | vlan-id                                                              | Enables L2 802.1Q encapsulation of traffic on a router port in a VLAN. |
|                           | force                                                                | Forces admin state down.                                               |
| <b>Default</b>            | N/A                                                                  |                                                                        |
| <b>Configuration Mode</b> | Config Interface Ethernet                                            |                                                                        |
| <b>History</b>            | 3.3.5200                                                             |                                                                        |
| <b>Role</b>               | admin                                                                |                                                                        |
| <b>Example</b>            | switch (config interface ethernet 1/10)# encapsulation dot1q vlan 10 |                                                                        |
| <b>Related Commands</b>   |                                                                      |                                                                        |
| <b>Note</b>               |                                                                      |                                                                        |



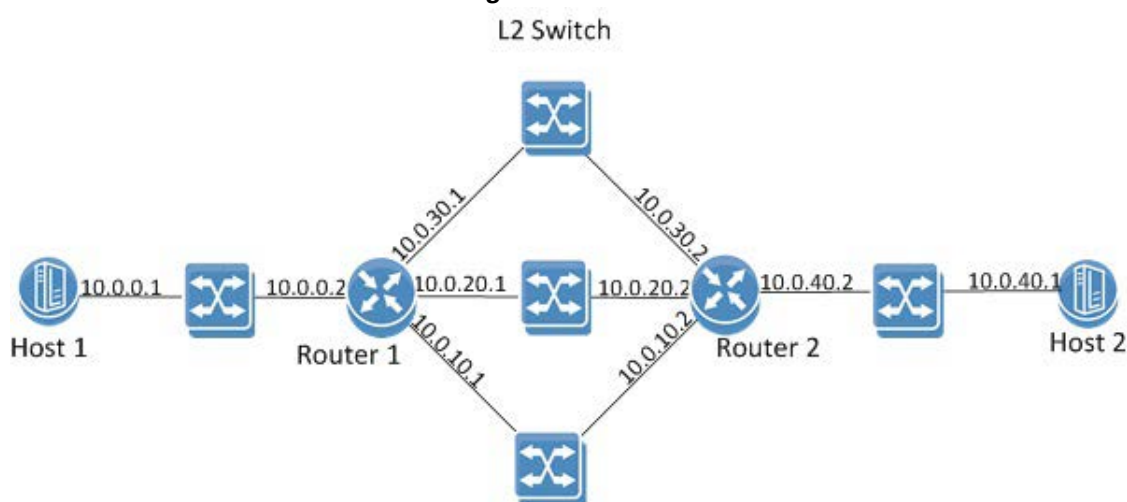
### 6.1.2 Equal Cost Multi-Path Routing (ECMP)

Equal-cost multi-path routing (ECMP) is a routing strategy where next-hop packet forwarding to a single destination can occur over multiple paths.

In Figure 30, routers R1 and R2 can both access each of their router peer networks. Router R1 routing table for 10.0.40/24 will contain the following routes:

- 10.0.10.2
- 10.0.20.2
- 10.0.30.2

**Figure 30: ECMP**



The load balancing function of the ECMP is configured globally on the system.

Hash algorithm can be symmetric or asymmetric. In symmetric hash functions bidirectional flows between routes will follow the same path, while in asymmetric hash functions, bidirectional traffic can follow different paths in both directions.

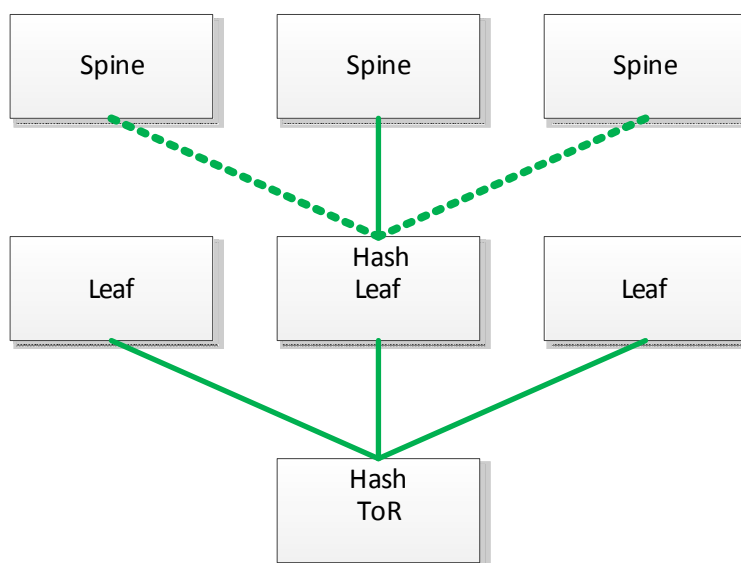
The following load balancing types are supported:

- Source IP & Port – source IP (SIP) and source UDP/TCP port: If the packet is not UDP/TCP, only SIP is used for the hash calculation. This is an asymmetric hash function.
- Destination IP & Port – destination IP (DIP) and destination UDP/TCP port: If the packet is not UDP/TCP, only DIP is used for the hash calculation. This is an asymmetric hash function.
- Source and Destination IP & Port – destination and source IP, as well as destination and source UDP/TCP port: If the packet is not UDP/TCP, only SIP/DIP are used for the hash calculation. This is a symmetric hash function.
- Traffic Class: Load balance based on the traffic class assigned to the packet. This is an asymmetric hash function.
- All (default): all above fields are part of the hash calculations. This is a symmetric hash function.

### 6.1.2.1 Hash Functions

It is advised that LAG and ECMP hash function configuration over more than one hop is different. If the same hash function is used over two hops, all the traffic sorted from one hop to following one will arrive already having the same characteristics, which will render the next hash function useless. For example, configure load-balancing on the first hop based on source IP while on the next hop based on destination IP.

**Figure 31: Multiple Hash Functions**



### 6.1.3 IPv4 Routing Mode

The resources available for IPv4 routing are as follows:

- number of IPv4 neighbors – 2048
- number of IPv4 unicast routes – 4096
- number of IPv4 multicast routes – 672



Prior to upgrading to this software release the user must align the number of configured multicast routes to number defined above.

### 6.1.4 Creating an IP Interface

Preconditions:

- An L3 license must be installed on your system (UPGR-xxxx-GW)
- A VLAN must be created using the command `vlan <vlan-id>`
- There must be at least one interface attached to this VLAN (to do so, run the `switchport` command in the interface configuration mode)
- There must be at least one interface in the operational state “UP”

➤ **To create an IP interface:**

**Step 1.** Create a VLAN interface using the command `interface vlan <vlan-id>`.

**Step 2.** Apply an IP address and a network mask to the interface using the ip address command.

```
switch (config)# vlan 10
switch (config vlan 10)# exit
switch (config)# interface ethernet 1/1
switch (config interface ethernet 1/1)#switchport mode access
switch (config interface ethernet 1/1)#exit
switch (config)# show interface ethernet status // making sure there is a
 port in UP state
```

| Port        | Operational state | Speed   | Nego- |
|-------------|-------------------|---------|-------|
| tiation     |                   |         |       |
| ----        | -----             | -----   | ----  |
| -----       |                   |         |       |
| Eth1/1      | Up                | 40 Gbps | No-   |
| Negotiation |                   |         |       |
| ...         |                   |         |       |

```
switch (config)#interface vlan 10
switch (config interface vlan)#ip address 10.10.10.10 /24
switch (config interface vlan)#show interface vlan 10
```

```
Vlan 10
Admin state: Enabled
Operational state: UP
Mac Address: 00:02:c9:5d:e0:f0
Internet Address: 10.10.10.10/24
Broadcast address: 10.10.10.255
MTU: 1500 bytes
Description: my-ip-interface
Counters: disabled
switch (config interface vlan)#
```

## 6.1.5 Commands

### 6.1.5.1 General

#### ip routing

**ip routing**  
**no ip routing**

Enables L3 capabilities: IP router interfaces, static routing and routing protocols.  
The no form of the command disables L3 capabilities, however does not delete the L3 configuration.

|                           |                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                            |
| <b>Default</b>            | IP routing is disabled                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                         |
| <b>History</b>            | 3.2.0230                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                          |
| <b>Example</b>            | switch (config) # ip routing<br>switch (config) #                                                                                                                              |
| <b>Related Commands</b>   | interface vlan<br>show ip routing                                                                                                                                              |
| <b>Note</b>               | <ul style="list-style-type: none"><li>• This command requires L3 license (i.e.LIC-1036-L3)</li><li>• Disabling the command does not remove the feature configuration</li></ul> |

## show ip routing

### show ip routing

Displays IP routing admin state.

|                           |                                                                               |
|---------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                           |
| <b>Default</b>            | N/A                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                              |
| <b>History</b>            | 3.2.0230                                                                      |
| <b>Role</b>               | admin                                                                         |
| <b>Example</b>            | switch (config) # show ip routing<br>IP routing: enabled<br>switch (config) # |
| <b>Related Commands</b>   | ip routing                                                                    |
| <b>Note</b>               |                                                                               |

## 6.1.5.2 Interface VLAN

### interface vlan

**interface vlan <vlan-id>**  
**no interface vlan <vlan-id>**

Creates a VLAN interface and enters the interface VLAN configuration mode.  
 The no form of the command deletes the VLAN interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                       |                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | vlan-id                                                                                                                                                                                                                                                                                                                                                               | A numeric range of 1-4094 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                   |                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                |                           |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                              |                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                 |                           |
| <b>Example</b>            | <pre>switch (config) # interface vlan 10 switch (config interface vlan 10) # show interfaces vlan 10  Vlan 10   Admin state: Enabled   Operational state: Down (no up member port)   Mac Address: 00:02:c9:5d:e0:f0   Internet Address: 0.0.0.0/0   Broadcast address: 255.255.255.255   MTU: 1522 bytes   Description: N/A switch (config interface vlan 10) #</pre> |                           |
| <b>Related Commands</b>   | <pre>ip routing vlan &lt;vlan-id&gt; switchport mode switchport access show interfaces vlan</pre>                                                                                                                                                                                                                                                                     |                           |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Make sure the VLAN was created, using the command “vlan &lt;vlan-id&gt;” in the global configuration mode</li> <li>• The VLAN must be assigned to one of the L2 interfaces. To do so, run the command “switchport ...”</li> <li>• At least one interface belong to that VLAN must be in UP state</li> </ul>                  |                           |

## ip address

**ip address** <ip-address> <mask>  
**no ip address** <ip-address> <mask>

Enters user-defined description for the interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                 |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                   | IPv4 address                                                                                                                                                    |
|                           | mask                                                                                                                                                                                                                                                                                                                                                                                         | There are two possible ways to the mask: <ul style="list-style-type: none"> <li>• /length (i.e. /24)</li> <li>• Network address (i.e. 255.255.255.0)</li> </ul> |
| <b>Default</b>            | 0.0.0.0/0                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                 |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config interface vlan 10) # ip address 10.10.10.10 /24 switch (config interface vlan 10) # show interfaces vlan 10  Vlan 10   Admin state: Enabled   Operational state: Down (no up member port)   Mac Address: 00:02:c9:5d:e0:f0   Internet Address: 10.10.10.10/24   Broadcast address: 10.10.10.255   MTU: 1522 bytes   Description: my-ip-interface switch (config) #</pre> |                                                                                                                                                                 |
| <b>Related Commands</b>   | interface vlan                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                 |

## counters

**counters**  
**no counters**

Enables counters gathering on the IP interface.  
 The no form of the command disables counters gathering on the IP interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | counters are disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre> switch (config) # interface vlan 10 switch (config interface vlan 10) # counters switch (config interface vlan 10) # show interfaces vlan 10  Vlan 10   Admin state: Enabled   Operational state: Down (no up member port)   Mac Address: 00:02:c9:5d:e0:f0   Internet Address: 0.0.0.0/0   Broadcast address: 255.255.255.255   MTU: 1522 bytes   Description: N/A  RX   0          Unicast frames   0          Multicast frames   0          Unicast octets   0          Multicast octets   0          Error frames   0          Error octets TX   0          Unicast frames   0          Multicast frames   0          Unicast octets   0          Multicast octets  switch (config) # </pre> |
| <b>Related Commands</b>   | interface vlan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Enabling counters for the router interface adds delay to the traffic stream</li> <li>There are maximum of 16 counter sets</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



## description

**description** <string>

**no description**

Enters a description for the interface.

The no form of the command sets the description to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                            |                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | string                                                                                                                                                                                                                                                                                                                                                                                     | User defined string |
| <b>Default</b>            | ""                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                                      |                     |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| <b>Example</b>            | <pre>switch (config interface vlan 10) #description my-ip-interface switch (config interface vlan 10) #show interfaces vlan 10  Vlan 10   Admin state: Enabled   Operational state: Down (no up member port)   Mac Address: 00:02:c9:5d:e0:f0   Internet Address: 0.0.0.0/0   Broadcast address: 255.255.255.255   MTU: 1522 bytes   Description: my-ip-interface  switch (config) #</pre> |                     |
| <b>Related Commands</b>   | interface vlan                                                                                                                                                                                                                                                                                                                                                                             |                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                            |                     |

## mtu

**mtu <size> [force]**

**no mtu**

Sets the MTU for the interface.

The no form of the command sets the MTU to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                           |                                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | size                                                                                                                                                                                                                                                                                                                                                                                      | 1500-9216.                     |
|                           | force                                                                                                                                                                                                                                                                                                                                                                                     | Forces command implementation. |
| <b>Default</b>            | 1522                                                                                                                                                                                                                                                                                                                                                                                      |                                |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                                     |                                |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                  |                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                     |                                |
| <b>Example</b>            | <pre>switch (config interface vlan 10)# mtu 9216 switch (config interface vlan 10 # show interfaces vlan 10  Vlan 10   Admin state: Enabled   Operational state: Down (no up member port)   Mac Address: 00:02:c9:5d:e0:f0   Internet Address: 10.10.10.10/24   Broadcast address: 10.10.10.255   MTU: 9216 bytes   Description: my-ip-interface switch (config interface vlan 10)#</pre> |                                |
| <b>Related Commands</b>   | interface vlan                                                                                                                                                                                                                                                                                                                                                                            |                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                           |                                |

## shutdown

**shutdown**  
**no shutdown**

Disables the interface.  
 The no form of the command enables the interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | The interface is enabled.                                                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config interface vlan 20) # shutdown switch (config interface vlan 20) # show interfaces vlan 20  Vlan 20   Admin state: Disabled   Operational state: Down (admin down)   Mac Address: 00:02:c9:5d:e0:f0   Internet Address: 0.0.0.0/0   Broadcast address: 255.255.255.255   MTU: 1522 bytes   Description: N/A switch (config interface vlan 20) #</pre> |
| <b>Related Commands</b>   | interface vlan                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                          |

## clear counters

### clear counters

Clears the interface counters.

|                           |                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                       |
| <b>Default</b>            | N/A                                                                                       |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                     |
| <b>History</b>            | 3.2.0230                                                                                  |
| <b>Role</b>               | admin                                                                                     |
| <b>Example</b>            | switch (config interface vlan 10) # clear counters<br>switch (config interface vlan 10) # |
| <b>Related Commands</b>   | interface vlan<br>counters                                                                |
| <b>Note</b>               |                                                                                           |

## ip icmp redirect

**ip icmp redirect**  
**no ip icmp redirect**

Enables ICMP redirect.  
 The no form of the command disables ICMP redirect.

|                           |                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                              |
| <b>Default</b>            | Enabled                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                            |
| <b>History</b>            | 3.4.0010                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                            |
| <b>Example</b>            | switch (config interface vlan 10) # no ip icmp redirect                                                                                                                          |
| <b>Related Commands</b>   | interface vlan<br>counters                                                                                                                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>ICMP redirect transmits messages to hosts alerting them about the existence of more efficient routes to a specific destination</li> </ul> |

## show interfaces vlan

**show interfaces vlan [<vlan-ID> | status]**

Displays the interface VLAN configuration and status per VLAN or as a summarized list.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Syntax Description</b> | vlan-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A numeric range of 1-4094                |
|                           | status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Displays a summarized status table.      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |
|                           | 3.3.4000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Added ARP timeout to the output example. |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |
| <b>Example</b>            | <pre>switch (config) # show interfaces vlan status  Interface      Description      State ----- Vlan1          N/A              Up Vlan10         my-ip-interface  Down Vlan11         N/A              Up Vlan12         N/A              Up Vlan13         N/A              Up Vlan14         N/A              Up Vlan20         N/A              Down switch (config) # show interfaces vlan 10  Vlan 10   Admin state: Enabled   Operational state: Down (no up member port)   Mac Address: 00:02:c9:5d:e0:f0   MTU: 1522 bytes   Arp timeout: 240 seconds   Description: N/A  RX   0          Unicast frames   0          Multicast frames   0          Unicast octets   0          Multicast octets   0          Error frames   0          Error octets TX   0          Unicast frames   0          Multicast frames   0          Unicast octets   0          Multicast octets  switch (config) #</pre> |                                          |
| <b>Related Commands</b>   | interface vlan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |
| <b>Note</b>               | Byte counters count octets starting from the IP header field, it doesn't count the L2 header (MAC, VLAN) and FCS length.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |

### 6.1.5.3 Loopback Interface

## interface loopback

**interface loopback <id>**  
**no interface loopback <id>**

Creates a loopback interface and enters the interface configuration mode.  
 The no form of the command deletes the interface.

|                           |                                                                                                                                                                                                                                                               |                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Syntax Description</b> | id                                                                                                                                                                                                                                                            | A numeric range of 1-32 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                           |                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                        |                         |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                                                                                      |                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                         |                         |
| <b>Example</b>            | <pre>switch (config) # interface loopback 10 switch (config interface loopback 10) #</pre>                                                                                                                                                                    |                         |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                               |                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Up to 32 loopback interfaces can be configured.</li> <li>Within the loopback configuration mode, you can configure description and ip-address.</li> <li>MTU cannot be configured on the loopback interface.</li> </ul> |                         |

## ip address

**ip address** <ip-address> <mask>  
**no ip address** <ip-address> <mask>

Enters user-defined description for the interface.

|                           |                                                                    |                                                                                                                                                                             |
|---------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                         | IPv4 address.                                                                                                                                                               |
|                           | mask                                                               | There are two possible ways to the mask: <ul style="list-style-type: none"> <li>• /length – only /32 is possible</li> <li>• Network address (i.e. 255.255.255.0)</li> </ul> |
| <b>Default</b>            | 0.0.0.0/0                                                          |                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config Interface Loopback                                          |                                                                                                                                                                             |
| <b>History</b>            | 3.3.5006                                                           |                                                                                                                                                                             |
| <b>Role</b>               | admin                                                              |                                                                                                                                                                             |
| <b>Example</b>            | switch (config interface loopback 10) # ip address 10.10.10.10 /32 |                                                                                                                                                                             |
| <b>Related Commands</b>   | interface loopback                                                 |                                                                                                                                                                             |
| <b>Note</b>               |                                                                    |                                                                                                                                                                             |



## description

**description** <string>

**no description**

Enters a description for the interface.

The no form of the command sets the description to default.

|                           |                                                                    |                      |
|---------------------------|--------------------------------------------------------------------|----------------------|
| <b>Syntax Description</b> | string                                                             | User defined string. |
| <b>Default</b>            | ""                                                                 |                      |
| <b>Configuration Mode</b> | Config Interface Loopback                                          |                      |
| <b>History</b>            | 3.3.5006                                                           |                      |
| <b>Role</b>               | admin                                                              |                      |
| <b>Example</b>            | switch (config interface loopback 10) #description my-ip-interface |                      |
| <b>Related Commands</b>   | interface loopback                                                 |                      |
| <b>Note</b>               |                                                                    |                      |

## show interfaces loopback

**show interface loopback <id>**

Shows the attribute of the interface loopback.

|                           |                                                                                                                                                                                                |                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Syntax Description</b> | id                                                                                                                                                                                             | A numeric range of 1-32 |
| <b>Default</b>            | N/A                                                                                                                                                                                            |                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                         |                         |
| <b>History</b>            | 3.2.3000                                                                                                                                                                                       |                         |
| <b>Role</b>               | admin                                                                                                                                                                                          |                         |
| <b>Example</b>            | <pre>switch (config) # show interfaces loopback 2  Loopback 2   Internet Address: 2.2.2.2/32   Broadcast address: 2.2.2.2   MTU: 1500 bytes   Description: my-loopback switch (config) #</pre> |                         |
| <b>Related Commands</b>   |                                                                                                                                                                                                |                         |
| <b>Note</b>               | •                                                                                                                                                                                              |                         |

### 6.1.5.4 Routing and ECMP

## ip route

**ip route <IP prefix> <netmask> <next hop IP address>**  
**no ip route <IP prefix> <netmask> <next hop IP address>**

Sets a static route.  
 The no form of the command deletes the static route

| Syntax Description | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | IPv4 address                                                                                                                                             |  |  |  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|                    | netmask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | There are two possible ways to the mask: <ul style="list-style-type: none"><li>/length (i.e. /24)</li><li>Network address (i.e. 255.255.255.0)</li></ul> |  |  |  |
|                    | next hop IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IPv4 address of the next hop.                                                                                                                            |  |  |  |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                          |  |  |  |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                          |  |  |  |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                          |  |  |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                          |  |  |  |
| Example            | <pre>switch (config) # ip route 10.10.10.0 /24 172.28.2.4 switch (config) # show ip route Destination      Mask           Gateway        Interface      Source default          0.0.0.0        172.28.0.1     mgmt0          DHCP 10.10.10.0       255.255.255.0  172.28.2.4     mgmt0          static 172.28.0.0       255.255.0.0    0.0.0.0        mgmt0          direct 1.0.0.0          255.255.255.0  0.0.0.0        Vlan11         direct 2.0.0.0          255.255.255.0  0.0.0.0        Vlan12         direct 3.0.0.0          255.255.255.0  0.0.0.0        Vlan13         direct 4.0.0.0          255.255.255.0  0.0.0.0        Vlan14         direct 8.8.8.0          255.255.255.0  0.0.0.0        Vlan1          direct 7.7.7.0          255.255.255.0  1.0.0.2        Vlan11         static                   2.0.0.2        Vlan12         static                   4.0.0.2        Vlan14         static                   3.0.0.2        Vlan13         static switch (config) #</pre> |                                                                                                                                                          |  |  |  |
| Related Commands   | interface vlan<br>ip load sharing<br>show ip route                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                          |  |  |  |
| Note               | The IP prefix and the network mask must be aligned in the LSB mask, (for example 192.168.0.0 /16 or 192.168.10.0 /24, or 192.168.10.10 /32)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                          |  |  |  |

## ip load-sharing

**ip load-sharing <type>**

**no ip load-sharing**

This command sets the ECMP load sharing mode.

The no form of the command sets the load-sharing to default.

|                           |                                                                                                                           |                                                                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                                                      | <ul style="list-style-type: none"> <li>• source-ip-port</li> <li>• destination-ip-port</li> <li>• source-destination-ip-port</li> <li>• traffic-class</li> <li>• all</li> </ul> |
| <b>Default</b>            | all                                                                                                                       |                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                    |                                                                                                                                                                                 |
| <b>History</b>            | 3.2.0230                                                                                                                  |                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                     |                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # ip load-sharing all switch (config) # show ip load-sharing Load sharing: all switch (config)</pre> |                                                                                                                                                                                 |
| <b>Related Commands</b>   | ip route                                                                                                                  |                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                           |                                                                                                                                                                                 |

## show ip route

**show ip route [static | summary | -a]**

Displays the route table.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |                                                                           |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------|--------|-----------------|--|-------------|------|---------|-----------|--------|-----------------|---------|---------|---------------|-------|------|-----|-------------|---------------|---------|-------|--------|-----|------------|---------------|---------|--------|--------|-----|------------|---------------|---------|--------|--------|-----|-------------|---------------|---------|--------|------|-------|
| Syntax Description | static                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               | Displays routing table                                                    |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
|                    | summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               | Displays routing table summary                                            |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
|                    | -a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               | Displays static routes currently inactive due to the interface being down |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                                                                           |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                                                                           |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | First version                                                             |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
|                    | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | Added Distance/Metric column                                              |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
|                    | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | Added -a parameter                                                        |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                                                                           |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| Example            | switch (config) # show ip route<br><table><tr><td>Destination</td><td>Mask</td><td>Gateway</td><td>Interface</td><td>Source</td><td>Distance/Metric</td></tr><tr><td>default</td><td>0.0.0.0</td><td>10.224.13.254</td><td>mgmt0</td><td>DHCP</td><td>0/0</td></tr><tr><td>10.224.13.0</td><td>255.255.255.0</td><td>0.0.0.0</td><td>mgmt0</td><td>direct</td><td>0/0</td></tr><tr><td>11.11.11.0</td><td>255.255.255.0</td><td>0.0.0.0</td><td>vlan11</td><td>direct</td><td>0/0</td></tr><tr><td>23.23.23.0</td><td>255.255.255.0</td><td>0.0.0.0</td><td>vlan23</td><td>direct</td><td>0/0</td></tr><tr><td>172.21.23.0</td><td>255.255.255.0</td><td>0.0.0.0</td><td>vlan23</td><td>ospf</td><td>110/2</td></tr></table> switch (config) # |               |                                                                           |        |                 |  | Destination | Mask | Gateway | Interface | Source | Distance/Metric | default | 0.0.0.0 | 10.224.13.254 | mgmt0 | DHCP | 0/0 | 10.224.13.0 | 255.255.255.0 | 0.0.0.0 | mgmt0 | direct | 0/0 | 11.11.11.0 | 255.255.255.0 | 0.0.0.0 | vlan11 | direct | 0/0 | 23.23.23.0 | 255.255.255.0 | 0.0.0.0 | vlan23 | direct | 0/0 | 172.21.23.0 | 255.255.255.0 | 0.0.0.0 | vlan23 | ospf | 110/2 |
| Destination        | Mask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gateway       | Interface                                                                 | Source | Distance/Metric |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| default            | 0.0.0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10.224.13.254 | mgmt0                                                                     | DHCP   | 0/0             |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| 10.224.13.0        | 255.255.255.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0.0.0       | mgmt0                                                                     | direct | 0/0             |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| 11.11.11.0         | 255.255.255.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0.0.0       | vlan11                                                                    | direct | 0/0             |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| 23.23.23.0         | 255.255.255.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0.0.0       | vlan23                                                                    | direct | 0/0             |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| 172.21.23.0        | 255.255.255.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0.0.0       | vlan23                                                                    | ospf   | 110/2           |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| Related Commands   | ip route                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                           |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |
| Note               | ECMP routes are displayed in an aggregated manner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                                                                           |        |                 |  |             |      |         |           |        |                 |         |         |               |       |      |     |             |               |         |       |        |     |            |               |         |        |        |     |            |               |         |        |        |     |             |               |         |        |      |       |

## show ip load-sharing

### show ip load-sharing

Displays ECMP hash attribute.

|                           |                                                                                  |
|---------------------------|----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                              |
| <b>Default</b>            | N/A                                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                 |
| <b>History</b>            | 3.2.0230                                                                         |
| <b>Role</b>               | admin                                                                            |
| <b>Example</b>            | switch (config) # show ip load-sharing<br>Load sharing: all<br>switch (config) # |
| <b>Related Commands</b>   | ip load-sharing                                                                  |
| <b>Note</b>               |                                                                                  |

### 6.1.5.5 Network to Media Resolution (ARP)

#### ip arp

**ip arp <ip-address> <MAC-address>**  
**no ip arp <ip-address>**

Adds static ARP entry for the defined interface.  
 The no form of the command deletes the static ARP entry from the interface.

| Syntax Description        | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | IPv4 Address                           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
|                           | Mac-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mac address (format XX:XX:XX:XX:XX:XX) |
| <b>Default</b>            | No static ARP entries                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b>Example</b>            | <pre>switch (config interface vlan 11) # ip arp 1.0.0.3 00:11:22:33:44:55 switch (config interface vlan 11) # show ip arp  ARP Timeout: 2000  Total number of entries: 55 IP Address          MAC Address          Interface 1.0.0.2             00:02:c9:5c:30:40    Vlan11 1.0.0.3             00:11:22:33:44:55    Vlan11 2.0.0.2             00:02:c9:5c:30:40    Vlan12 3.0.0.2             00:02:c9:5c:30:40    Vlan13 4.0.0.2             00:02:c9:5c:30:40    Vlan14 switch (config interface vlan 11) #</pre> |                                        |
| <b>Related Commands</b>   | show ip arp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |

## ip arp timeout

**ip arp timeout <timeout-value>**

**no ip arp timeout**

Sets the dynamic ARP cache timeout.

The no form of the command sets the timeout to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | timeout-value                                                                                                                                                                                                                                                                                                                                                                                            | Time (in seconds) that an entry remains in the ARP cache. Range: 60-28800. |
| <b>Default</b>            | 1500 seconds                                                                                                                                                                                                                                                                                                                                                                                             |                                                                            |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                                                                                                                                                                                                    |                                                                            |
| <b>History</b>            | 3.2.0230                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                            |
| <b>Example</b>            | <pre>switch (config) # ip arp timeout 2000 switch (config) # show ip arp  ARP Timeout: 2000  Total number of entries: 55 IP Address      MAC Address      Interface 1.0.0.2         00:02:c9:5c:30:40 Vlan11 1.0.0.3         00:11:22:33:44:55 Vlan11 2.0.0.2         00:02:c9:5c:30:40 Vlan12 3.0.0.2         00:02:c9:5c:30:40 Vlan13 4.0.0.2         00:02:c9:5c:30:40 Vlan14 switch (config) #</pre> |                                                                            |
| <b>Related Commands</b>   | ip arp<br>show ip arp                                                                                                                                                                                                                                                                                                                                                                                    |                                                                            |
| <b>Note</b>               | This value is used as the ARP timeout whenever a new IP interface is created.                                                                                                                                                                                                                                                                                                                            |                                                                            |



## clear ip arp

**clear ip arp** {[interface <type>] | [<IP-address>]}

Clears dynamic arp entries from the ARP table with possible filters.

|                           |                                                             |                                                       |
|---------------------------|-------------------------------------------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | vlan-id                                                     | Clears dynamic ARP entries for a interface.           |
|                           | IP address                                                  | Clears dynamic ARP entries for a specific IP address. |
| <b>Default</b>            | N/A                                                         |                                                       |
| <b>Configuration Mode</b> | Config                                                      |                                                       |
| <b>History</b>            | 3.2.0230                                                    |                                                       |
| <b>Role</b>               | admin                                                       |                                                       |
| <b>Example</b>            | <pre>switch (config) # clear ip arp switch (config) #</pre> |                                                       |
| <b>Related Commands</b>   | <pre>ip arp show ip arp</pre>                               |                                                       |
| <b>Note</b>               |                                                             |                                                       |

## show ip arp

**show ip arp [interface <type>| <ip-address> | count]**

Displays ARP table.

|                                               |                                                           |                                                                                  |                   |           |
|-----------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-------------------|-----------|
| Syntax Description                            | interface type                                            | Filters the table according to a specific interface (i.e. interface vlan, mgmt0) |                   |           |
|                                               | ip-address                                                | Filters the table to the specific ip-address                                     |                   |           |
|                                               | count                                                     | Shows ARP statistics                                                             |                   |           |
| Default                                       | N/A                                                       |                                                                                  |                   |           |
| Configuration Mode                            | Any Command Mode                                          |                                                                                  |                   |           |
| History                                       | 3.3.3000                                                  |                                                                                  |                   |           |
| Role                                          | admin                                                     |                                                                                  |                   |           |
| Example                                       | switch-626a54 [standalone: master] (config) # show ip arp |                                                                                  |                   |           |
|                                               | Total number of entries: 3                                |                                                                                  |                   |           |
|                                               | Address                                                   | Type                                                                             | Hardware Address  | Interface |
|                                               | -----                                                     |                                                                                  |                   |           |
|                                               | ---                                                       |                                                                                  |                   |           |
|                                               | 10.209.0.1                                                | Dynamic ETH                                                                      | 00:00:5E:00:01:01 | mgmt0     |
| 10.209.1.120                                  | Dynamic ETH                                               | 00:02:C9:62:E8:C2                                                                | mgmt0             |           |
| 10.209.1.121                                  | Dynamic ETH                                               | 00:02:C9:62:E7:42                                                                | mgmt0             |           |
| switch (config) # show ip arp count           |                                                           |                                                                                  |                   |           |
| ARP Table size: 3 (inband: 0, out of band: 3) |                                                           |                                                                                  |                   |           |
| switch (config) #                             |                                                           |                                                                                  |                   |           |
| Related Commands                              |                                                           |                                                                                  |                   |           |
| Note                                          |                                                           |                                                                                  |                   |           |

### 6.1.5.6 IP Diagnostic Tools

## ping

**ping [-LRUbdnqrVvA] [-c count] [-i interval] [-w deadline] [-p pattern] [-s packetsize] [-t ttl] [-I interface or address] [-M mtu discovery hint] [-S sndbuf] [-T timestamp option ] [-Q tos ] [hop1 ...] destination**

Sends ICMP echo requests to a specified host.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | Linux Ping options                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # ping 172.30.2.2 PING 172.30.2.2 (172.30.2.2) 56(84) bytes of data. 64 bytes from 172.30.2.2: icmp_seq=1 ttl=64 time=0.703 ms 64 bytes from 172.30.2.2: icmp_seq=2 ttl=64 time=0.187 ms 64 bytes from 172.30.2.2: icmp_seq=3 ttl=64 time=0.166 ms 64 bytes from 172.30.2.2: icmp_seq=4 ttl=64 time=0.161 ms 64 bytes from 172.30.2.2: icmp_seq=5 ttl=64 time=0.153 ms 64 bytes from 172.30.2.2: icmp_seq=6 ttl=64 time=0.144 ms ^C --- 172.30.2.2 ping statistics --- 6 packets transmitted, 6 received, 0% packet loss, time 5004ms rtt min/avg/max/mdev = 0.144/0.252/0.703/0.202 ms switch (config) #</pre> |
| <b>Related Commands</b>   | traceroute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Ping to IPv6 address is not supported.</li> <li>• When using -I option use the interface name + interface number, for example “ping -I vlan10”</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## traceroute

**traceroute** [-46dFITUnrAV] [-f first\_ttl] [-g gate,...] [-i device] [-m max\_ttl] [-N squeries] [-p port] [-t tos] [-l flow\_label] [-w waittime] [-q nqueries] [-s src\_addr] [-z sendwait] host [packetlen]

Traces the route packets take to a destination.

| Syntax | Description                                                                                                                                                                                                                                               |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -4     | Uses IPv4.                                                                                                                                                                                                                                                |
| -6     | Uses IPv6                                                                                                                                                                                                                                                 |
| -d     | Enables socket level debugging.                                                                                                                                                                                                                           |
| -F     | Sets DF ("do not fragment" bit) on.                                                                                                                                                                                                                       |
| -I     | Uses ICMP ECHO for tracerouting.                                                                                                                                                                                                                          |
| -T     | Uses TCP SYN for tracerouting.                                                                                                                                                                                                                            |
| -U     | Uses UDP datagram (default) for tracerouting.                                                                                                                                                                                                             |
| -n     | Does not resolve IP addresses to their domain names.                                                                                                                                                                                                      |
| -r     | Bypasses the normal routing and send directly to a host on an attached network.                                                                                                                                                                           |
| -A     | Performs AS path lookups in routing registries and print results directly after the corresponding addresses.                                                                                                                                              |
| -V     | Prints version info and exit.                                                                                                                                                                                                                             |
| -f     | Starts from the first_ttl hop (instead from 1).                                                                                                                                                                                                           |
| -g     | Routes packets throw the specified gateway (maximum 8 for IPv4 and 127 for IPv6).                                                                                                                                                                         |
| -i     | Specifies a network interface to operate with.                                                                                                                                                                                                            |
| -m     | Sets the max number of hops (max TTL to be reached). Default is 30.                                                                                                                                                                                       |
| -N     | Sets the number of probes to be tried simultaneously (default is 16).                                                                                                                                                                                     |
| -p     | Uses destination port. It is an initial value for the UDP destination port (incremented by each probe, default is 33434), for the ICMP seq number (incremented as well, default from 1), and the constant destination port for TCP tries (default is 80). |
| -t     | Sets the TOS (IPv4 type of service) or TC (IPv6 traffic class) value for outgoing packets.                                                                                                                                                                |
| -l     | Uses specified flow_label for IPv6 packets.                                                                                                                                                                                                               |

|    |                                                                                                                                                                                                      |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -w | Sets the number of seconds to wait for response to a probe (default is 5.0). Non-integer (float point) values allowed too.                                                                           |
| -q | Sets the number of probes per each hop. Default is 3.                                                                                                                                                |
| -s | Uses source src_addr for outgoing packets.                                                                                                                                                           |
| -z | Sets minimal time interval between probes (default is 0). If the value is more than 10, then it specifies a number in milliseconds, else it is a number of seconds (float point values allowed too). |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # traceroute 192.168.10.70 traceroute to 192.168.10.70 (192.168.10.70), 30 hops max, 40 byte packets 1 172.30.0.1 (172.30.0.1) 3.632 ms 2.849 ms 3.544 ms 2 10.222.128.46 (10.222.128.46) 3.176 ms 3.289 ms 3.656 ms 3 10.158.128.30 (10.158.128.30) 15.331 ms 15.819 ms 16.388 ms 4 10.158.128.65 (10.158.128.65) 20.468 ms 7.893 ms 12.27 ms 5 10.7.34.115 (10.7.34.115) 16.405 ms 11.985 ms 12.264 ms 6 192.168.10.70 (192.168.10.70) 16.377 ms 16.091 ms 20.475 ms switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Traceroute for IPv6 is not supported</li> <li>The following flags are not supported: -6, -l, -A</li> <li>When using -i option use the interface name + interface number, for example “traceroute -i vlan10”</li> </ul>                                                                                                                                                                                                                                                       |

## tcpdump

```
tcpdump [-aAdeflLnNOPqRStuUvxX] [-c count] [-C file_size]
 [-E algo:secret] [-F file] [-i interface] [-M secret]
 [-r file] [-s snaplen] [-T type] [-w file]
 [-W filecount] [-y datalinktype] [-Z user]
 [expression]
```

Invokes standard binary, passing command line parameters straight through. Runs in foreground, printing packets as they arrive, until the user hits Ctrl+C.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # tcpdump ..... 09:37:38.678812 IP 192.168.10.7.ssh &gt; 192.168.10.1.54155: P 1494624:1494800(176) ack 625 win 90 &lt;nop,nop,timestamp 5842763 858672398&gt; 09:37:38.678860 IP 192.168.10.7.ssh &gt; 192.168.10.1.54155: P 1494800:1495104(304) ack 625 win 90 &lt;nop,nop,timestamp 5842763 858672398&gt; ... 9141 packets captured 9142 packets received by filter 0 packets dropped by kernel switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When using -i option use the interface name + interface number, for example “tcpdump -i vlan10”</li> <li>For all flag options of this command refer to the linux ‘man page’ of tcp dump.</li> </ul>                                                                                                                                                                                                       |

### 6.1.5.7 QoS

## qos map dscp-to-pcp preserve-pcp

**qos map dscp-to-pcp preserve-pcp**  
**no qos map dscp-to-pcp preserve-pcp**

Configures the router to copy PCP bits when transferring data from one subnet to another.

The no form of the command disables this ability.

|                           |                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | Disabled.                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.3.4000                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | switch (config) # qos map dscp-to-pcp preserve-pcp<br>switch (config) #                                                                                                                                                                                                                                                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               | <ul style="list-style-type: none"><li>• This commands applies the configuration for all router interfaces</li><li>• As part of its function, the router performs DSCP to PCP bits mapping (fixed mapping). By activating the command the router preserves the PCP bits from one subnet to another subnet (PCP bits are copied).</li></ul> |

## 6.2 IPv6



To activate this feature please contact your Mellanox support representative.

IP version 6 (IPv6) is a routing protocol which succeeds IPv4. With the expansion of the Internet and data bases IPv6 addresses consist of 128 bits whose purpose is to allow networks to include a significantly higher number of nodes by increasing the pool of available unique IP addresses. IPv6 packets alleviate overhead and allow for future customizability.

Textual representations of IPv6 addresses consist of 128 bits made up from eight 16-bit hexadecimal numbers separated by colons. IPv6 addresses may be abbreviated as follows:

- You may omit leading zeros in each 16-bit sequence
- You may replace an entire sequence with a double colon if it equals zero

For example, these addresses represent the same IPv6 address:

- af23:0000:0000:0000:1284:037d:35ce:2401
- af23:0:0:0:1284:37d:35ce:2401
- af23::1284:37d:35ce:2401

IPv6 addresses typically denote a 64-bit network prefix and a 64-bit host address.



Only static IPv6 and ECMP are supported.



The number of static IPv6 addresses supported is 64.

### 6.2.1 Neighbor Discovery Protocol

Neighbor Discovery (ND) decides relationships between neighbors and replaces ARP, ICMP, and ICMP redirect in IPv4.

Five kinds of ICMPv6 packets are defined by ND:

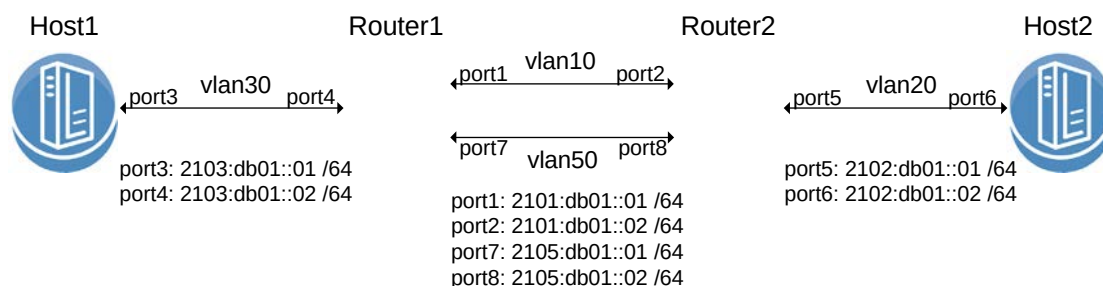
- Neighbor advertisement
- Router advertisement
- Neighbor solicitation
- Router solicitation
- Redirect

ND checks whether a neighboring node's address has changed, whether the neighbor is still reachable, and also resolves the address of the neighbor which a packet is being forwarded to. ND is also useful for network nodes for discovering other nodes and performing basic link-layer configuration.



## 6.2.2 Configuring IPv6

**Figure 32: IPv6 Network**



### ➤ To configure Router1:

**Step 1.** Enable IP routing. Run:

```
switch (config)# ip routing
```

**Step 2.** Enable forwarding IPv6 unicast packets. Run:

```
switch (config)# ipv6 routing
```

**Step 3.** Configure the VLAN interfaces. Run:

```
switch (config)# interface vlan 10
switch (config interface vlan 10) # exit
switch (config)# interface vlan 30
switch (config interface vlan 30) # exit
switch (config)# interface vlan 50
switch (config interface vlan 50) # exit
```

**Step 4.** Enable IPv6 on the VLAN interfaces. Run:

```
switch (config)# interface vlan 10 ipv6 enable
switch (config)# interface vlan 30 ipv6 enable
switch (config)# interface vlan 50 ipv6 enable
```

**Step 5.** Configure IPv6 addresses for each one of the VLAN interfaces. Run:

```
switch (config)# interface vlan 10 ipv6 address 2101:db01::1 /64
switch (config)# interface vlan 30 ipv6 address 2103:db01::2 /64
switch (config)# interface vlan 50 ipv6 address 2105:db01::1 /64
```

**Step 6.** Configure IPv6 unicast. Run:

```
switch (config)# ipv6 route 2002:db01:: /64 2101:db01::2
```

**Step 7.** Configure IPv6 unicast. Run:

```
switch (config)# ipv6 route 2002:db01:: /64 2105:db01::2
```

### ➤ To configure Router2:

**Step 1.** Disable prefix mode on the CLI. Run:

```
switch (config)# no cli default prefix-mode enable
```

**Step 2.** Enable the VLANs on the system. Run:

```
switch (config)# vlan 10
switch (config vlan 10) # exit
switch (config)# vlan 20
switch (config vlan 20) # exit
switch (config)# vlan 50
switch (config vlan 50) # exit
```

**Step 3.** Configure the switch ports to accept the VLANs of which they are part only. Run:

```
switch (config)# interface ethernet 1/1 switchport access vlan 10 // port2
switch (config)# interface ethernet 1/2 switchport access vlan 50 // port8
switch (config)# interface ethernet 1/36 switchport access vlan 20 // port5
```

**Step 4.** Disable spanning tree. Run:

```
switch (config)# no spanning-tree
```

**Step 5.** Enable IP routing. Run:

```
switch (config)# ip routing
```

**Step 6.** Enable forwarding IPv6 unicast packets. Run:

```
switch (config)# ipv6 routing
```

**Step 7.** Configure the VLAN interfaces. Run:

```
switch (config)# interface vlan 10
switch (config interface vlan 10) # exit
switch (config)# interface vlan 20
switch (config interface vlan 20) # exit
switch (config)# interface vlan 50
switch (config interface vlan 50) # exit
```

**Step 8.** Enable IPv6 on the VLAN interfaces. Run:

```
switch (config)# interface vlan 10 ipv6 enable
switch (config)# interface vlan 20 ipv6 enable
switch (config)# interface vlan 50 ipv6 enable
```

**Step 9.** Configure IPv6 addresses for each one of the VLAN interfaces. Run:

```
switch (config)# interface vlan 10 ipv6 address 2101:db01::2 /64
switch (config)# interface vlan 20 ipv6 address 2102:db01::1 /64
switch (config)# interface vlan 50 ipv6 address 2105:db01::2 /64
```

**Step 10.** Configure IPv6 unicast. Run:

```
switch (config)# ipv6 route 2103:db01:: /64 2101:db01::1
```

**Step 11.** Configure IPv6 unicast. Run:

```
switch (config)# ipv6 route 2103:db01:: /64 2105:db01::1
```

➤ ***Ping neighbor to verify IPv6 configuration:***

```
switch (config)# ping6 2101:db01::2
PING 2101:db01::2(2101:db01::2) 56 data bytes
64 bytes from 2101:db01::2: icmp_seq=1 ttl=64 time=0.371 ms
64 bytes from 2101:db01::2: icmp_seq=2 ttl=64 time=0.620 ms
64 bytes from 2101:db01::2: icmp_seq=3 ttl=64 time=0.192 ms
64 bytes from 2101:db01::2: icmp_seq=4 ttl=64 time=0.277 ms
64 bytes from 2101:db01::2: icmp_seq=5 ttl=64 time=0.231 ms
```

## 6.2.3 Commands

### ipv6 enable

**ipv6 enable**  
**no ipv6 enable**

Assigns automatic local IPv6 address to the interface.  
 The no form of the command deassigns that automatic local address and disables IPv6 if no static IPv6 address has been assigned to the interface.

|                           |                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | Unassigned                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                           |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | switch (config vlan 10) # ipv6 enable                                                                                                                                                                                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Assigning an IPv6 address to an interface enables IPv6 processing on the interface also</li> <li>IPv6 must be enabled globally before running this command per interface. The command “ipv6 enable” on page 152 must be configured.</li> </ul> |

## ipv6 address

**ipv6 address** <ipv6-address> /<length>  
**no ipv6 address** <ipv6-address> [/<length>]

Enables IPv6 processing and assigns an IPv6 address to the interface.  
 The no form of the command removes the specified IPv6 address.

|                           |                                                                                                                                                                                                                                                                                                                                        |                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | ipv6-address                                                                                                                                                                                                                                                                                                                           | IPv6 address. Format: a:b:c:d:e:f:g:h.                         |
|                           | length                                                                                                                                                                                                                                                                                                                                 | Mask length for the associated address space.<br>Range: 1-128. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                    |                                                                |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                            |                                                                |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                               |                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                  |                                                                |
| <b>Example</b>            | switch (config vlan 10) # ipv6 address fe80:ac10::fa01:0202 /120<br>switch (config vlan 10) # ipv6 address fe80:ac10::fa01:0202/120                                                                                                                                                                                                    |                                                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                        |                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>An interface can have up to 16 IPv6 address assignments</li> <li>If the no command does not include a specific address, all address assignments are removed from the interface</li> <li>The mask length may be configured without a space (i.e. &lt;ipv6-address&gt;/&lt;length&gt;)</li> </ul> |                                                                |

## ipv6 nd managed-config-flag

**ipv6 nd managed-config-flag**  
**no ipv6 nd managed-config-flag**

Sets the managed address configuration flag in IPv6 router advertisements.  
The no form of the command restores the default setting.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Managed address configuration flag is not set                                                                                               |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.4.1100                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd managed-config-flag                                                                                       |
| <b>Related Commands</b>   |                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                             |

## ipv6 nd ns-interval

**ipv6 nd ns-interval <period>**

**no ipv6 nd ns-interval**

Configures the interval between IPv6 neighbor solicitation (NS) transmissions.  
The no form of the command restores the default value.

|                           |                                                                                                                                             |                                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Syntax Description</b> | period                                                                                                                                      | In milliseconds. Range: 1000-4294967295. |
| <b>Default</b>            | 1000 milliseconds                                                                                                                           |                                          |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                          |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                          |
| <b>Role</b>               | admin                                                                                                                                       |                                          |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ns-interval 1500                                                                                          |                                          |
| <b>Related Commands</b>   |                                                                                                                                             |                                          |
| <b>Note</b>               |                                                                                                                                             |                                          |

## ipv6 nd other-config-flag

**ipv6 nd other-config-flag**  
**no ipv6 nd other-config-flag**

Indicates that other configuration information is available via DHCPv6.  
 The no form of the command removes the other configuration flag.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Not set                                                                                                                                     |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.4.1100                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd other-config-flag                                                                                         |
| <b>Related Commands</b>   |                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                             |



## ipv6 nd prefix

**ipv6 nd prefix** <ipv6-address> /<length> [no-advertise] [no-autoconfig] [no-onlink] [valid-time {<time> | infinite}] [preferred-time {<time> | infinite}]  
**no ipv6 nd prefix** <prefix>

Configures inclusion for router advertisements (RAs) for neighbor.  
 The no form of the command removes the corresponding IPv6 nd prefix.

|                           |                                                                                                                                             |                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ipv6-address                                                                                                                                | IPv6 address. Format: a:b:c:d:e:f:g:h.                                                                |
|                           | length                                                                                                                                      | Prefix length for the associated address space. Range: 1-128.                                         |
|                           | no-advertise                                                                                                                                | Prevents advertising of the specified prefix.                                                         |
|                           | valid-time                                                                                                                                  | Time in seconds. Range: 0-4294967295. The value “infinite” is the same as the maximum value possible. |
|                           | preferred-time                                                                                                                              | Time in seconds. Range: 0-4294967295. The value “infinite” is the same as the maximum value possible. |
|                           | no-autoconfig                                                                                                                               | Indicates that this prefix can be used for stateless address configuration                            |
|                           | no-onlink                                                                                                                                   | Indicates that this prefix can be used for on-link determination                                      |
| <b>Default</b>            | valid-time: 2592000 seconds<br>preferred-time: 604800 seconds<br>no-autoconfig: autoconfig enabled<br>no-onlink: Set                        |                                                                                                       |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                                       |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                                       |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd prefix fe80:ac10::fa01:0202 /120                                                                          |                                                                                                       |
| <b>Related Commands</b>   |                                                                                                                                             |                                                                                                       |
| <b>Note</b>               | Valid time must be larger than preferred time                                                                                               |                                                                                                       |

## ipv6 nd ra dns-servers lifetime

**ipv6 nd ra dns-servers lifetime {<time> | infinite}**

**no ipv6 nd ra dns-servers lifetime**

Sets the default value for the lifetime of any recursive DNS server (RDNSS) configured on the interface.

The no form of the command removes the lifetime value.

|                           |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                           |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                                                                                                                                                                               | Possible values: <ul style="list-style-type: none"> <li>0 – RDNSS configured on the command mode interface without a custom lifetime value must not be used</li> <li>1-4294967295 – in seconds</li> </ul> |
|                           | infinite                                                                                                                                                                                                                                                                                           | Equivalent to 4294967295.                                                                                                                                                                                 |
| <b>Default</b>            | If no lifetime period is configured on the interface, the default value is 1.5 times the maximum RA interval set by the command “ipv6 nd ra interval”.                                                                                                                                             |                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                        |                                                                                                                                                                                                           |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                           |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra dns-servers lifetime infinite                                                                                                                                                                                                                                 |                                                                                                                                                                                                           |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                           |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>A lifetime value set for an individual RDNSS overrides this value.</li> <li>The lifetime value is the maximum amount of time after a route advertisement packet is sent that the RDNSS referenced in the packet may be used for name resolution.</li> </ul> |                                                                                                                                                                                                           |

## ipv6 nd ra dns-server

**ipv6 nd ra dns-server <ip-address> [lifetime [<time> | infinite]]**

**no ipv6 nd ra dns-server [<ip-address>]**

Configures the IPv6 address of a preferred recursive DNS server (RDNSS) to include in the neighbor-discovery router advertisements (RAs).

The no form of the command removes the RDNSS from the configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | IP address of RDNSS                                                                                                                                                                                |
|                           | lifetime                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Maximum lifetime value for the specified RDNSS entry. Possible values: <ul style="list-style-type: none"> <li>0 – RDNSS address must no longer be used</li> <li>1-4294967295 in seconds</li> </ul> |
|                           | infinite                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Equivalent to 4294967295 seconds.                                                                                                                                                                  |
| <b>Default</b>            | If no lifetime period is configured on the interface, the default value is 1.5 times the maximum RA interval set by the command “ipv6 nd ra interval”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                    |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                    |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra dns-server fe80:ac10::fa01:0202<br>lifetime infinite                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Including RDNSS information in RAs provides DNS server configuration for connected IPv6 hosts without requiring DHCPv6</li> <li>Multiple servers can be configured on the interface by using the command repeatedly</li> <li>A lifetime value for the RDNSS can optionally be specified with this command, and overrides any default value configured for the interface using the ipv6 nd ra dns-servers lifetime command</li> <li>Lifetime must be configured according to the following:<br/> <math>\text{MaxRtrAdvInterval} \leq \text{lifetime} \leq 2 * \text{MaxRtrAdvInterval}</math>; where MaxRtrAdvInterval is the maximum RA interval</li> </ul> |                                                                                                                                                                                                    |

## ipv6 nd ra dns-suffix

**ipv6 nd ra dns-suffix <domain-name> [lifetime {<time> | infinite}]**  
**no ipv6 nd ra dns-suffix [<domain-name>]**

Creates a DNS search list (DNSSL) to include in the neighbor-discovery router advertisements (RAs)<sup>1</sup>.

The no form of the command resets the value of this parameter to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | domain-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Domain suffix for IPv6 hosts to append to short unqualified domain names for DNS queries.<br>The suffix must contain only alphanumeric characters, "." (periods), "-" (hyphens), and must begin and end with an alphanumeric character.         |
|                           | lifetime                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sets the maximum time, in seconds (relative to the time the packet is sent), over which this DNSSL domain name MAY be used for name resolution.<br>Lifetime must be bounded as follows:<br>MaxRtrAdvInterval <= Lifetime <= 2*MaxRtrAdvInterval |
|                           | time                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Possible values: <ul style="list-style-type: none"> <li>0 – DNSSL must not be used for name resolution</li> <li>1-4294967295 – in seconds</li> </ul>                                                                                            |
|                           | infinite                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A value of all one bits (0xffffffff) equivalent to 4294967295.                                                                                                                                                                                  |
| <b>Default</b>            | The value configured in the command "ipv6 nd ra dns-server".                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                 |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra dns-suffix example lifetime infinite                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The DNSSL contains the domain names of DNS suffixes for IPv6 hosts to append to short, unqualified domain names for DNS queries</li> <li>Multiple DNS domain names can be added to the DNSSL by reusing the command</li> <li>A lifetime value for the DNSSL can optionally be specified with this command which overrides any default value configured for the interface using the command "ipv6 nd ra dns-suffixes lifetime"</li> </ul> |                                                                                                                                                                                                                                                 |

1. As defined in RFC 6106.

## ipv6 nd ra dns-suffixes lifetime

**ipv6 nd ra dns-suffixes lifetime {<time> | infinite}**  
**no ipv6 nd ra dns-suffixes lifetime**

Creates a DNS search list (DNSSL) to include in the neighbor-discovery router advertisements (RAs)<sup>1</sup>.

The no form of the command resets the value of this parameter to its default.

|                           |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | domain-name                                                                                                                                                                                                                                                           | Domain suffix for IPv6 hosts to append to short unqualified domain names for DNS queries.<br>The suffix must contain only alphanumeric characters, "." (periods), "-" (hyphens), and must begin and end with an alphanumeric character. |
|                           | time                                                                                                                                                                                                                                                                  | Possible values: <ul style="list-style-type: none"> <li>0 – DNSSL must not be used for name resolution if no custom value is configured</li> <li>1-4294967295 – in seconds</li> </ul>                                                   |
|                           | infinite                                                                                                                                                                                                                                                              | Equivalent to 4294967295.                                                                                                                                                                                                               |
| <b>Default</b>            | 1.5 times the RA interval configured on the interface                                                                                                                                                                                                                 |                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                           |                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                         |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra dns-suffix example lifetime infinite                                                                                                                                                                                             |                                                                                                                                                                                                                                         |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The DNSSL contains the domain names of DNS suffixes for IPv6 hosts to append to short, unqualified domain names for DNS queries</li> <li>Multiple DNS domain names can be added to the DNSSL by reusing the command</li> </ul> |                                                                                                                                                                                                                                         |

1. As defined in RFC 6106.

## ipv6 nd ra hop-limit

**ipv6 nd ra hop-limit <limit>**

**no ipv6 nd ra hop-limit**

Sets a suggested hop-limit value to be included in route advertisement (RA) packets. The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                             |                                                                                                                                                                                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | limit                                                                                                                                       | The hop-limit value to be included by attached hosts in outgoing packets. <ul style="list-style-type: none"> <li>• 0 – unspecified (by this router)</li> <li>• 1-255 – number of hops</li> </ul> |
| <b>Default</b>            | Limit value is 64                                                                                                                           |                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                                                                                                                                  |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                                                                                                                                  |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra hop-limit 70                                                                                           |                                                                                                                                                                                                  |
| <b>Related Commands</b>   |                                                                                                                                             |                                                                                                                                                                                                  |
| <b>Note</b>               |                                                                                                                                             |                                                                                                                                                                                                  |

## ipv6 nd ra interval max-period

**ipv6 nd ra interval max-period <time> [min-period <time>]**  
**no ipv6 nd ra interval**

Configures the interval between IPv6 router advertisement (RA) transmissions.  
 The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                                                                                                                                                                                                                                                    | Maximum interval between successive IPv6 router advertisement transmissions. Range: 4-1800 seconds.                                                                                                                  |
|                           | min-period                                                                                                                                                                                                                                                                                                                                                              | minimum interval between successive IPv6 router advertisement transmissions. <ul style="list-style-type: none"> <li>No parameter: Default is used</li> <li>4-1800: Valid range when scale is set seconds.</li> </ul> |
| <b>Default</b>            | max-period: 600 seconds<br>min-period: See Note                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                                                             |                                                                                                                                                                                                                      |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra interval max-period 600                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The min-period must be <math>0.33 * \text{&lt;max-period&gt;}</math> if <math>\text{&lt;max-period&gt;}</math> is <math>\geq 9</math> seconds; otherwise, the default is MaxRtrAdvInterval</li> <li>The parameter min-period must be no less than 3 seconds and no greater than <math>0.75 * \text{max-period}</math></li> </ul> |                                                                                                                                                                                                                      |

## ipv6 nd ra lifetime

**ipv6 nd ra lifetime <time>**

**no ipv6 nd ra lifetime**

Configures the value that the switch places in the router lifetime field of IPv6 router advertisements (RAs).

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                        | <p>The router lifetime specifies the period that the router can be considered as a default router by RA recipients in seconds.</p> <ul style="list-style-type: none"> <li>• 0 – the router should not be considered a default router on this interface</li> <li>• 1-9000 – lifetime period advertised in RAs should not be less than the max router advertisement interval</li> </ul> |
| <b>Default</b>            | 3*<max router advertisement interval>                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra lifetime 300                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Commands</b>   |                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                       |



## ipv6 nd ra mtu suppress

**ipv6 nd ra mtu suppress**  
**no ipv6 nd ra mtu suppress**

Suppresses the router advertisement (RA) MTU option to ensure that all nodes on a link use the same MTU value.

The no form of the command restores the MTU option to enabled.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Suppressed                                                                                                                                  |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.4.1100                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra mtu suppress                                                                                           |
| <b>Related Commands</b>   |                                                                                                                                             |
| <b>Note</b>               | If not suppressed, MTU of the interface is advertised.                                                                                      |

## ipv6 nd ra suppress

**ipv6 nd ra suppress [all]**

**no ipv6 nd ra suppress**

Suppresses periodic IPv6 router advertisement (RA) transmissions.  
The no form of the command restores the transmission of RAs.

|                           |                                                                                                                                             |                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | all                                                                                                                                         | Configures the switch to suppress all RAs, including those responding to a router solicitation. |
| <b>Default</b>            | Only unsolicited RAs transmitted periodically are suppressed                                                                                |                                                                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                                 |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                                 |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd ra suppress all                                                                                           |                                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                             |                                                                                                 |
| <b>Note</b>               |                                                                                                                                             |                                                                                                 |

## ipv6 nd reachable-time

**ipv6 nd reachable-time <time>**

**no ipv6 nd reachable-time**

Sets the time period the switch includes in the reachable time field of out-going advertisements (RAs).

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                             |                                                                                                                                                                                                                    |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                                                                                                                        | In milliseconds; the reachable time defines the period that a node assumes a neighbor is reachable after having received a reachability confirmation. Range: 0-3600000 where “0” means unspecified by this router. |
| <b>Default</b>            | 0 (unspecified)                                                                                                                                                                                                                             |                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                 |                                                                                                                                                                                                                    |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                    |                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                       |                                                                                                                                                                                                                    |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd reachable-time 30000                                                                                                                                                                                      |                                                                                                                                                                                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                             |                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• RAs that advertise zero seconds indicate that the router does not specify a reachable time</li> <li>• The default value to use for calculating neighbor reachability time is 30 seconds</li> </ul> |                                                                                                                                                                                                                    |

## ipv6 nd router-preference

**ipv6 nd router-preference {high | medium | low}**  
**no ipv6 nd router-preference**

Sets the value the switch enters in the default router preference (DRP) field of router advertisements (RAs) it sends.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Default</b>            | Medium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd router-preference high                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>IPv6 hosts maintain a default router list from which to select a router for traffic to offlink destinations. The router's address is then saved in the destination cache. The neighbor discovery protocol (NDP) prefers routers that are reachable or probably reachable over routers whose reachability is unknown or suspect. For reachable or probably reachable routers, NDP can either select the same router every time or cycle through the router list. DRP values specify a host's preferred router.</li> <li>If router lifetime is zero, preference value must be medium</li> </ul> |

## ipv6 nd retrans-timer

**ipv6 nd retrans-timer <time>**

**no ipv6 nd retrans-timer**

Advertises the time between neighbor solicitation (NS) messages in ICMPv6 router advertisement messages.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                             |                                                                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                        | In milliseconds; the time between retransmitted neighbor solicitation messages. Possible values: <ul style="list-style-type: none"> <li>• 0 – unspecified</li> <li>• Range – 1000-4294967295</li> </ul> |
| <b>Default</b>            | 0 (unspecified)                                                                                                                             |                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                                                                                                                                         |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                                                                                                                                         |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd retrans-timer                                                                                             |                                                                                                                                                                                                         |
| <b>Related Commands</b>   |                                                                                                                                             |                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                             |                                                                                                                                                                                                         |

## ipv6 nd dad attempts

**ipv6 nd dad attempts <number>**

**no ipv6 nd dad attempts**

Sets the number of consecutive neighbor solicitation messages sent for duplicate address detection (DAD) validation.

The no form of the command resets the value to its default.

|                           |                                                                                                                                             |                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | number                                                                                                                                      | Number of attempts: <ul style="list-style-type: none"> <li>• 0 – DAD is not performed</li> <li>• Valid range: 1-1000</li> </ul> |
| <b>Default</b>            | 1                                                                                                                                           |                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                                                                 |
| <b>History</b>            | 3.4.1100                                                                                                                                    |                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                                                                 |
| <b>Example</b>            | switch (config vlan 10) # ipv6 nd dad attempts 10                                                                                           |                                                                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                             |                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                             |                                                                                                                                 |

## ipv6 neighbor

**ipv6 neighbor** <ipv6-addr> {**ethernet** <port> | **port-channel** <port-channel> | **vlan** <vlan-id>} <mac\_addr>  
**no ipv6 neighbor** <ipv6-addr> [{**ethernet** <port> | **port-channel** <port-channel> | **vlan** <vlan-id>}]

Creates an IPv6 neighbor discovery cache static entry.  
 The no form of the command removes the specified static entry from the IPv6 neighbor discovery cache.

|                           |                                                                          |                                      |
|---------------------------|--------------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | ipv6-addr                                                                | IPv6 address                         |
|                           | ethernet <port>                                                          | Ethernet port. Format <slot>/<port>. |
|                           | vlan <vlan-id>                                                           | VLAN ID                              |
| <b>Default</b>            | N/A                                                                      |                                      |
| <b>Configuration Mode</b> | Config                                                                   |                                      |
| <b>History</b>            | 3.4.1100                                                                 |                                      |
| <b>Role</b>               | admin                                                                    |                                      |
| <b>Example</b>            | switch (config vlan 10) # ipv6 neighbor 2001:db01::1 vlan 10 4:4:4:4:4:4 |                                      |
| <b>Related Commands</b>   |                                                                          |                                      |
| <b>Note</b>               | This command do not affect any dynamic entries in the cache.             |                                      |

## clear ipv6 neighbors

**clear ipv6 neighbors** [ethernet <port> | port-channel <port-channel> | vlan <vlan-id>] [<ipv6-addr>]

Removes the specified dynamic IPv6 neighbor discovery cache entries.

|                    |                                                                                                                                                                                                                                                                                                |                                       |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Syntax Description | ethernet                                                                                                                                                                                                                                                                                       | Ethernet port. Format: <slot>/<port>. |
|                    | vlan                                                                                                                                                                                                                                                                                           | VLAN interface                        |
|                    | ipv6-addr                                                                                                                                                                                                                                                                                      | IPv6 address                          |
| Default            | N/A                                                                                                                                                                                                                                                                                            |                                       |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                         |                                       |
| History            | 3.4.1100                                                                                                                                                                                                                                                                                       |                                       |
| Role               | admin                                                                                                                                                                                                                                                                                          |                                       |
| Example            | switch (config) # clear ipv6 neighbors ethernet 1/4                                                                                                                                                                                                                                            |                                       |
| Related Commands   |                                                                                                                                                                                                                                                                                                |                                       |
| Note               | <ul style="list-style-type: none"><li>• Commands that do not specify an IPv6 address remove all dynamic entries for the listed interface</li><li>• Commands that do not specify an interface remove all dynamic entries</li><li>• See the command “clear ipv6 neighbors” on page 147</li></ul> |                                       |



## ipv6 route

**ipv6 route <ipv6-address> /<length> <next-hop> [<distance>]**

**no ipv6 route <ipv6-address> /<length> [next-hop]**

Creates an IPv6 static route.

The no form of the command deletes static routes.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                   |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax Description | ipv6-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | IPv6 address. Format: a:b:c:d:e:f:g:h.                                                                                                                                                                                                            |
|                    | length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Prefix length for the associated address space. Range: 1-128.                                                                                                                                                                                     |
|                    | next-hop                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | IPv6 address of the next-hop                                                                                                                                                                                                                      |
|                    | distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Administrative distance assigned to route. Options include: <ul style="list-style-type: none"><li>No parameter – route is assigned a default administrative distance of 1</li><li>1-255 – the administrative distance assigned to route</li></ul> |
| Default            | No distance parameter indicated: Administrative distance of 1                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                   |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                   |
| History            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                   |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                   |
| Example            | switch (config) # ipv6 route 3003:db01:: /64 2001:db01::1<br>switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                   |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                   |
| Note               | <ul style="list-style-type: none"><li>Static routes have a default administrative distance of 1</li><li>Assigning a higher administrative distance to a static route configures it to be overridden by dynamic routing data.</li><li>Multiple routes which are configured to the same destination with the same administrative distance comprise an Equal Cost Multi-Path (ECMP) route</li><li>A no command not including a source deletes all statements to the destination</li></ul> |                                                                                                                                                                                                                                                   |

## ipv6 routing

**ipv6 routing**  
**no ipv6 routing**

Enables forwarding IPv6 unicast packets.  
 The no form of the command disables IPv6 unicast routing.

|                           |                                                                                                                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                           |
| <b>Default</b>            | Disabled                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                         |
| <b>Example</b>            | switch (config) # ipv6 routing                                                                                                                                                                                                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When routing is enabled, the switch attempts to deliver inbound packets to destination addresses by forwarding them to interfaces or next hop addresses specified by the IPv6 routing table</li> </ul> |

## show ipv6 interface

**show ipv6 interface** [{**ethernet** <port> | **port-channel** <port-channel> | **vlan** <vlan-id>}] **brief**

Displays the status of specified routed interfaces that are configured for IPv6.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | ethernet <port>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Displays output pertaining to the specified Ethernet interface |
|                           | port-channel <port-channel>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Displays output pertaining to the specified LAG interface      |
|                           | vlan <vlan-id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Displays output pertaining to the specified VLAN interface     |
|                           | brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Shows basic IPv6 information regarding all IPv6 interfaces     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                |
| <b>Example</b>            | <pre>switch (config) # show ipv6 interface  Vlan10 is Enabled ,   line protocol is UP   IPv6 : Enabled   Link-local address : fe80::f652:14ff:fe2d:9808   Global Unicast Addresses :   2001:db01::2 /64   Joined Group Addresses :   ff02::1   ff02::2   ff02::1:ff2d:9808   MTU : 1500 bytes   ICMP error messages limited to every milliseconds : 100   ICMP redirects : enabled   ND DAD : enabled   Number of DAD attempts : 1   ND reachable time (milliseconds) : 30000   ND advertised retransmit interval (milliseconds) : 0   ND router advertisements maximum interval (seconds) : 600   ND router advertisements minimum interval (seconds) : 198   ND router advertisements managed configuration flag : unset   ND router advertisements other configuration flag : unset   ND solicited router advertisement : suppressed   ND router advertisements lifetime (seconds) : 1800   ND advertised default router preference : medium   ND router advertisements hop-limit : 64  switch (config) #</pre> |                                                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |

## show ipv6 neighbors

**show ipv6 neighbors** [{**ethernet** <port> | **port-channel** <port-channel> | **vlan** <vlan-id>}] | <ipv6-addr> | **summary**]

Displays IPv6 neighbor discovery (ND) cache information.

|                           |                                                                                                                                                                                            |                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | ethernet <port>                                                                                                                                                                            | Shows output pertaining to the specified Ethernet interface. |
|                           | vlan <vlan-id>                                                                                                                                                                             | Shows output pertaining to the specified VLAN interface.     |
|                           | ipv6-addr                                                                                                                                                                                  | IPv6 address of individual neighbor                          |
| <b>Default</b>            | N/A                                                                                                                                                                                        |                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                           |                                                              |
| <b>History</b>            | 3.4.1100                                                                                                                                                                                   |                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                      |                                                              |
| <b>Example</b>            | <pre>switch (config) # show ipv6 route IPv6 Address          MAC Address          State      Interf ----- 2001:db01::1          f4:52:14:2d:98:88 Reachable vlan10 switch (config) #</pre> |                                                              |
| <b>Related Commands</b>   |                                                                                                                                                                                            |                                                              |
| <b>Note</b>               |                                                                                                                                                                                            |                                                              |

## show ipv6 route

**show ipv6 route** [<ipv6-addr> <prefix>] [connected | static | summary]

Displays IPv6 neighbor discovery (ND) cache information.

|                    |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                           |  |  |  |  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--|--|--|--|
| Syntax Description | ipv6-addr                                                                                                                                                                                                                                                                                                                                                                                  | Filters routes by IPv6 address or prefix                                  |  |  |  |  |
|                    | longer-prefixes                                                                                                                                                                                                                                                                                                                                                                            | Displays output for longer prefix entries                                 |  |  |  |  |
|                    | connected                                                                                                                                                                                                                                                                                                                                                                                  | Displays entries for routes to networks directly connected to the switch  |  |  |  |  |
|                    | static                                                                                                                                                                                                                                                                                                                                                                                     | Displays entries added through CLI commands                               |  |  |  |  |
|                    | summary                                                                                                                                                                                                                                                                                                                                                                                    | Displays the current contents of the IPv6 routing table in summary format |  |  |  |  |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                        |                                                                           |  |  |  |  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                           |                                                                           |  |  |  |  |
| History            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                   |                                                                           |  |  |  |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                      |                                                                           |  |  |  |  |
| Example            | <pre>switch (config) # show ipv6 route Destination  Mask  Gateway      Interface  Source      Distance/Metric fe80::       64    ::           mgmt0      Connected    256/1 fe80::       64    ::           mgmt1      Connected    256/1 2001:db01::  64    ::           vlan10     Connected    1/1 3003:db01::  64    2001:db01::1 vlan10     Static       1/20 switch (config) #</pre> |                                                                           |  |  |  |  |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                           |  |  |  |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                           |  |  |  |  |

## 6.3 OSPF

Open Shortest Path First (OSPF) is a link-state routing protocol for IP networks. It uses a link state routing algorithm and falls into the group of interior routing protocols, operating within a single autonomous system (AS).

OSPF-speaking routers send Hello packets to all OSPF-enabled IP interfaces. If two routers sharing a common data link agree on certain parameters specified in their respective Hello packets, they become neighbors.

Adjacencies, which can be thought of as virtual point-to-point links, are formed between some neighbors. OSPF defines several network types and several router types. The establishment of an adjacency is determined by the types of routers exchanging Hellos and the type of network over which the Hello packets are exchanged.

Each router sends link-state advertisements (LSAs) over all adjacencies. The LSAs describe all of the router's links, or interfaces, the router's neighbors, and the state of the links. These links might be to stub networks (those without another router attached), to other OSPF routers, to networks in other areas, or to external networks (those learned from another routing process). Because of the varying types of link-state information, OSPF defines multiple LSA types.

Each router receiving an LSA from a neighbor records the LSA in its link-state database and sends a copy of the LSA to all of its other neighbors. By flooding LSAs throughout an area, all routers will build identical link-state databases.

When the databases are complete, each router uses the SPF algorithm to calculate a loop-free graph describing the shortest (lowest cost) path to every known destination, with itself as the root.

When all link-state information has been flooded to all routers in an area, and neighbors have verified that their databases are identical, it means the link-state databases have been synchronized and the route tables have been built. Hello packets are exchanged between neighbors as keepalives, and LSAs are retransmitted. If the network topology is stable, no other activity should occur.

For OSPF network design over Mellanox L2 VMS, please refer to [Mellanox Virtual Modular Switch Reference Guide](#).

### 6.3.1 Router ID

The router ID is a 32-bit number assigned to the router running the OSPF protocol. This number uniquely identifies the router within an Autonomous System.

Router ID can be configured statically, however, if it is not configured, then the default election is as follows:

- If a loopback interface already exists, the router ID takes the loopback IP address;
- Otherwise, the lowest IP address is elected as router ID

### 6.3.2 ECMP

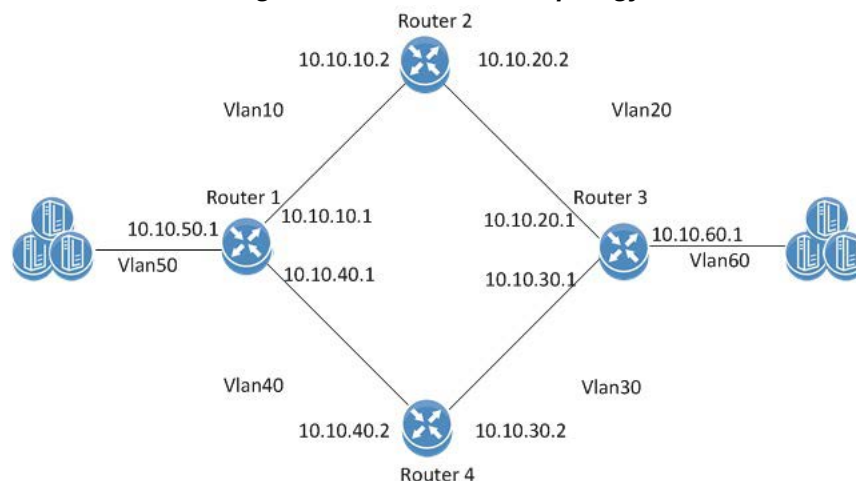
Equal-cost multi-path (ECMP) routing is a routing strategy where next-hop packet forwarding to a single destination can occur over multiple paths. The OSPF link-state routing algorithm can find multiple routes to the same destination, all multiple routes are added to the routing table only if those routes are equal-cost routes.

In case there are several routes with different cost, only the route with the lowest cost is selected. In case there are multiple routes with the same lowest cost, all of them are used (up to maximum of 64 ECMP routes).

ECMP is not configurable but is enabled by default for OSPF.

### 6.3.3 Configuring OSPF

**Figure 33: OSPF Basic Topology**



#### Precondition steps:



The following configuration example refers to Router 2 in [Figure 33](#). The remainder of the routers in the figure are configured similarly.



It is recommended to disable STP before enabling OSPF. Use the command `no spanning-tree`.

**Step 1.** Make sure an L3 license is installed. For a list of the available licenses see [Section 2.4, “Licenses,”](#) on page 39.

**Step 2.** Enable IP routing functionality. Run:.

```
switch (config)# ip routing
```

**Step 3.** Enable the desired VLAN. Run:.

```
switch (config)# vlan 10
switch (config)# vlan 20
```

**Step 4.** Add this VLAN to the desired interface. Run:

```
switch (config)# interface ethernet 1/1
switch (config ethernet 1/1)# switchport access vlan 10
switch (config ethernet 1/1)# exit
switch (config)# interface ethernet 1/2
switch (config ethernet 1/2)# switchport access vlan 20
```

**Step 5.** Create a VLAN interface. Run:

```
switch (config)# interface vlan 10
```

**Step 6.** Apply IP address to the VLAN interface. Run:

```
switch (config interface vlan 10)# ip address 10.10.10.2 /16
```

**Step 7.** Enable the interface. Run:

```
switch (config interface vlan 10)# no shutdown
```

**Step 8.** Create a second VLAN interface. Run:

```
switch (config)# interface vlan 20
```

**Step 9.** Apply IP address to the second VLAN interface. Run:

```
switch (config interface vlan 20)# ip address 10.10.20.2 /16
```

**Step 10.** Enable the second interface. Run:

```
switch (config interface vlan 20)# no shutdown
```

#### Basic OSPF Configuration:

**Step 1.** To enable OSPF configuration run:

```
switch (config)# protocol ospf
```

**Step 2.** To create a router OSPF instance run:

```
switch (config)# router ospf
```



Only one instance of OSPF is supported.

**Step 3.** Associate the VLAN interfaces to the OSPF area. Area 0 is the backbone area, run:

```
switch (config interface vlan 10)# ip ospf area 0
switch (config interface vlan 10)# exit
switch (config)# interface vlan 20
switch (config interface vlan 20)# ip ospf area 0
```

## 6.3.4 Verifying OSPF

➤ **To verify OSPF configuration and status:**

**Step 1.** Verify OSPF configuration and status. Run:

```
switch (config) # show ip ospf

Routing Process 1 with ID 10.10.10.10 vrf-default

Stateful High Availability disabled
Graceful-restart is not supported
Supports only single TOS (TOS 0) route
Opaque LSA not supported
OSPF Admin State is enabled
```



```

Redistributing External Routes: Disabled
Administrative distance 110
Reference Bandwidth is 40Gb
Initial SPF schedule delay 1 msec
SPF Hold time 10 msec
Maximum paths to destination 64
Router is not originating router LSA with maximum metric
Condition: Always
Number of external LSAs 0, checksum sum 0
Number of opaque AS LSAs 0,checksum sum 0
Number of areas is 1, 1 normal, 0 stub, 0 nssa
Number of active areas is 1, 1 normal, 0 stub, 0 nssa

Area (0.0.0.0) (Active)
Interfaces in this area: 2 Active Interfaces: 2
Passive Interfaces: 0
SPF Calculation has run 5 times
This area is Normal area
Number of LSAs: 1, checksum sum 7700

switch (config) #

```

- Step 2.** Verify the OSPF neighbors status. Make sure that each neighbor reaches FULL state with its peer to enable it take part in all dynamic routing changes in the network. Run:

```

switch (config) # show ip ospf neighbors

Neighbor 10.10.10.1, interface address 10.10.10.2
In the area 0.0.0.0 via interface Vlan 10
Neighbor priority is 1, State is FULL
BDR is 10.10.10.1
Options 0
Dead timer due in 35

Neighbor 10.10.20.1, interface address 10.10.20.2
In the area 0.0.0.0 via interface Vlan 20
Neighbor priority is 1, State is FULL
BDR is 10.10.20.1
Options 0
Dead timer due in 35

switch (config) #

```

**Step 3.** Verify the OSPF Interface configuration and status run:

```
switch (config) # show ip ospf interface

Interface Vlan is 10 Enabled, line protocol is Down
IP address 10.10.10.2, Mask 255.255.0.0
Process ID 1 VRF Default, Area 0.0.0.0
OSPF Interface Admin State is enabled
State DOWN, Network Type BROADCAST, Cost 1
Transmit delay 1 sec, Router Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals (sec's): Hello 10, Dead 40, Wait 40, Retransmit 5
No authentication
Number of opaque link LSAs: 0, checksum sum 0

Interface Vlan is 20 Enabled, line protocol is Up
IP address 10.10.20.2, Mask 255.255.0.0
Process ID 1 VRF Default, Area 0.0.0.0
OSPF Interface Admin State is enabled
State DESIGNATED ROUTER, Network Type BROADCAST, Cost 1
Transmit delay 1 sec, Router Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals (sec's): Hello 10, Dead 40, Wait 40, Retransmit 5
No authentication
Number of opaque link LSAs: 0, checksum sum 0

switch (config) #
```

## 6.3.5 Commands

### 6.3.5.1 Config

#### **protocol ospf**

**protocol ospf**  
**no protocol ospf**

Enables Open Shortest Path First Protocol (OSPF), and unhides the related OSPF commands.

The no form of the command deletes the OSPF configuration and hides the OSPF related commands.

|                           |                                |
|---------------------------|--------------------------------|
| <b>Syntax Description</b> | N/A                            |
| <b>Default</b>            | OSPF feature is disabled.      |
| <b>Configuration Mode</b> | Config                         |
| <b>History</b>            | 3.3.3500                       |
| <b>Role</b>               | admin                          |
| <b>Example</b>            | switch (config)# protocol ospf |
| <b>Related Commands</b>   | ip routing                     |
| <b>Note</b>               |                                |

## router ospf

**router ospf**  
**no router ospf**

Enters router OSPF configuration mode, and creates default OSPF instance if not exist.

The no form of the command deletes the OSPF instance.

|                           |                                                              |
|---------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                          |
| <b>Default</b>            | No router OSPF is created.                                   |
| <b>Configuration Mode</b> | Config                                                       |
| <b>History</b>            | 3.3.3500                                                     |
| <b>Role</b>               | admin                                                        |
| <b>Example</b>            | switch (config)# router ospf<br>switch (config router ospf)# |
| <b>Related Commands</b>   | N/A                                                          |
| <b>Note</b>               | Only one OSPF instance is supported.                         |

### 6.3.5.2 Config Router

## router-id

**router-id** <ip-address>  
**no router-id**

Sets Router ID for the OSPF instance.

The no form of the command causes automatic election of router ID by the router.

| Syntax Description        | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The Router id in IP address format. |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Default</b>            | <p>The router ID is a 32-bit number assigned to the router running the OSPF protocol. This number uniquely identifies the router within an Autonomous System. Router ID can be configured statically, however, if it is not configured, then the default election is as follows:</p> <ul style="list-style-type: none"> <li>• If a loopback interface already exists, the router ID takes the loopback IP address;</li> <li>• Otherwise, the lowest IP address is elected as router ID.</li> </ul> |                                     |
| <b>Configuration Mode</b> | Config OSPF Router                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |
| <b>Example</b>            | switch (config router ospf)# router-id 10.10.10.10                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |

## shutdown

**shutdown**  
**no shutdown**

Disables the OSPF instance.  
 The no form of the command enables the OSPF instance.

|                           |                                       |
|---------------------------|---------------------------------------|
| <b>Syntax Description</b> | N/A                                   |
| <b>Default</b>            | Enable (no shutdown)                  |
| <b>Configuration Mode</b> | Config OSPF Router                    |
| <b>History</b>            | 3.3.3500                              |
| <b>Role</b>               | admin                                 |
| <b>Example</b>            | switch (config router ospf)# shutdown |
| <b>Related Commands</b>   | N/A                                   |
| <b>Note</b>               |                                       |

## auto-cost reference-bandwidth

**auto-cost reference-bandwidth <ref-bw>**

**no auto-cost reference-bandwidth**

Configures reference-bandwidth in Gb/s (Default) or Mb/s.  
The no form of the command resets this parameter to its default value.

|                           |                                                            |               |
|---------------------------|------------------------------------------------------------|---------------|
| <b>Syntax Description</b> | value                                                      | Range: 1-4294 |
| <b>Default</b>            | Gb/s                                                       |               |
| <b>Configuration Mode</b> | Config OSPF Router                                         |               |
| <b>History</b>            | 3.3.3500                                                   |               |
| <b>Role</b>               | admin                                                      |               |
| <b>Example</b>            | switch (config router ospf)# auto-cost reference-bandwidth |               |
| <b>Related Commands</b>   | N/A                                                        |               |
| <b>Note</b>               |                                                            |               |

## distance

**distance <value>**

**no distance**

Configures the OSPF route administrative distance.

The no form of the command resets this parameter to default.

|                           |                                           |                                               |
|---------------------------|-------------------------------------------|-----------------------------------------------|
| <b>Syntax Description</b> | value                                     | OSPF administrative distance. Range is 1-255. |
| <b>Default</b>            | 110                                       |                                               |
| <b>Configuration Mode</b> | Config OSPF Router                        |                                               |
| <b>History</b>            | 3.3.3500                                  |                                               |
| <b>Role</b>               | admin                                     |                                               |
| <b>Example</b>            | switch (config router ospf)# distance 100 |                                               |
| <b>Related Commands</b>   | N/A                                       |                                               |
| <b>Note</b>               |                                           |                                               |



## redistribute

**redistribute {bgp | direct | static}**  
**no redistribute {bgp | direct | static}**

Import routes from other routing protocols as well as any statically configured routers into OSPF.

The no form of the command disables the importing of the routes.

|                           |                                                             |                                         |
|---------------------------|-------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | direct                                                      | Redistribute directly connected routes. |
|                           | bgp                                                         | Redistribute routes from BGP protocol.  |
|                           | static                                                      | Redistribute static configured routes.  |
| <b>Default</b>            | Disable (no redistribution)                                 |                                         |
| <b>Configuration Mode</b> | Config OSPF Router                                          |                                         |
| <b>History</b>            | 3.2.1000                                                    |                                         |
| <b>Role</b>               | admin                                                       |                                         |
| <b>Example</b>            | switch (config router ospf)# redistribute direct            |                                         |
| <b>Related Commands</b>   | N/A                                                         |                                         |
| <b>Note</b>               | Routes from multiple protocols can be imported in parallel. |                                         |

## timers throttle spf

**timers throttle spf <spf-delay> <spf-hold>**

**no timers throttle spf**

Sets the OSPF throttle SPF timers.

The no form of the command resets the timers to default.

|                           |                                                           |                                                                                                                |
|---------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | spf-delay                                                 | The interval by which SPF calculations delayed after a topology change reception. Range is 0-100 milliseconds. |
|                           | spf-hold                                                  | The minimum delay between two consecutive delay calculations. Range is 0-1000 milliseconds.                    |
| <b>Default</b>            | spf-delay: 1 millisecond<br>spf-hold: 10 millisecond      |                                                                                                                |
| <b>Configuration Mode</b> | Config OSPF Router                                        |                                                                                                                |
| <b>History</b>            | 3.3.3500                                                  |                                                                                                                |
| <b>Role</b>               | admin                                                     |                                                                                                                |
| <b>Example</b>            | switch (config router ospf)# timers throttle spf 100 1000 |                                                                                                                |
| <b>Related Commands</b>   | N/A                                                       |                                                                                                                |
| <b>Note</b>               |                                                           |                                                                                                                |

## area default-cost

**area <area-id> default-cost <cost>**

**no area <area-id> default-cost**

Specifies cost for the default summary route sent into an OSPF stub or not-so-stubby area (NSSA).

The no form of the command sets the cost to the default value.

|                           |                                                                                             |                                                              |
|---------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | area-id                                                                                     | OSPF area-id. Range is 0-4294967295.                         |
|                           | cost                                                                                        | The cost for the default summary route. Range is 1-16777215. |
| <b>Default</b>            | The summary route cost is based on the area border router that generated the summary route. |                                                              |
| <b>Configuration Mode</b> | Config OSPF Router                                                                          |                                                              |
| <b>History</b>            | 3.3.3500                                                                                    |                                                              |
| <b>Role</b>               | admin                                                                                       |                                                              |
| <b>Example</b>            | switch (config router ospf)# area 0 default-cost 100                                        |                                                              |
| <b>Related Commands</b>   | N/A                                                                                         |                                                              |
| <b>Note</b>               | Base cost for all calculation is 56GbE.                                                     |                                                              |

## area range

**area <area-id> range <ip-address> <prefix> [not-advertise]**  
**no area <area-id> range <ip-address> <prefix> [not-advertise]**

Consolidates and summarizes routes at an OSPF area boundary.  
 The no form of the command removes the ip-prefix range from summarization.

|                           |                                                           |                                                                      |
|---------------------------|-----------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | area-id                                                   | OSPF area-ID. Range is 0-4294967295.                                 |
|                           | ip-address                                                | IP Address.                                                          |
|                           | not-advertise                                             | Suppresses routes that match the specified IP address.               |
|                           | prefix                                                    | Network prefix (in the format of /24, or 255.255.255.0 for example). |
| <b>Default</b>            | Disabled                                                  |                                                                      |
| <b>Configuration Mode</b> | Config OSPF Router                                        |                                                                      |
| <b>History</b>            | 3.3.3500                                                  |                                                                      |
| <b>Role</b>               | admin                                                     |                                                                      |
| <b>Example</b>            | switch (config router ospf)# area 0 range 10.10.10.10 /24 |                                                                      |
| <b>Related Commands</b>   | N/A                                                       |                                                                      |
| <b>Note</b>               |                                                           |                                                                      |

## area stub

**area <area-id> stub [no-summary]**  
**no area <area-id> [stub [no-summary]]**

Configures an area as an OSPF stub area (an area is created if non-existent).  
 The no form of the command removes the stub area configuration and changes the area to normal, or deletes the area (if stub is not used).

|                           |                                          |                                                          |
|---------------------------|------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | area-id                                  | OSPF area-ID. Range is 0-4294967295.                     |
|                           | no-summary                               | Summary route will not be advertized into the stub area. |
| <b>Default</b>            | Summary route will be advertized.        |                                                          |
| <b>Configuration Mode</b> | Config OSPF Router                       |                                                          |
| <b>History</b>            | 3.3.3500                                 |                                                          |
| <b>Role</b>               | admin                                    |                                                          |
| <b>Example</b>            | switch (config router ospf)# area 0 stub |                                                          |
| <b>Related Commands</b>   | N/A                                      |                                                          |
| <b>Note</b>               |                                          |                                                          |

## area nssa

**area <area-id> nssa [default-information-originate [metric <m-value>] [metric-type <m-type>]] [nosummary] [translate type7 always]**  
**no area <area-id> nssa [default-information-originate ] [no-summary] [translate type7 always]**

Configures an area as an OSPF not-so-stubby (NSSA) area.  
 The no form of the command removes the NSSA area configuration and changes the area to default.

|                           |                                             |                                                                                  |
|---------------------------|---------------------------------------------|----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | area-id                                     | OSPF area ID. Range is 0-4294967295.                                             |
|                           | default-information-originate               | A default type7 LSA (Link State Advertisements) is generated into the NSSA area. |
|                           | m-type                                      | Metric type for OSPF. Range is 1-2.                                              |
|                           | m-value                                     | Metric value for OSPF. Range is 1-65535.                                         |
|                           | no-summary                                  | Summary route will not be advertized into the NSSA area.                         |
|                           | translate type7 always                      | Type7 LSAs is translated to type5 LSAs (Link State Advertisements).              |
| <b>Default</b>            | Default m-type:2<br>Default m-value:10      |                                                                                  |
| <b>Configuration Mode</b> | Config OSPF Router                          |                                                                                  |
| <b>History</b>            | 3.3.3500                                    |                                                                                  |
| <b>Role</b>               | admin                                       |                                                                                  |
| <b>Example</b>            | switch (config router ospf)# area 0 nssa    |                                                                                  |
| <b>Related Commands</b>   | N/A                                         |                                                                                  |
| <b>Note</b>               | An area can be either stub, NSSA or normal. |                                                                                  |

## summary-address

**summary-address** <ip-address> <prefix> [not-advertise]  
**no summary-address** <ip-address> <prefix> [not-advertise]

Creates aggregate addresses for the OSPF protocol.  
 The no form of the command disables the aggregation of the ip-address.

|                           |                                                              |                                                                      |
|---------------------------|--------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                   | The summary IP address.                                              |
|                           | not-advertise                                                | Suppresses routes that match the specified ip-address.               |
|                           | prefix                                                       | Network prefix (in the format of /24 or 255.255.255.0, for example). |
| <b>Default</b>            | N/A                                                          |                                                                      |
| <b>Configuration Mode</b> | Config OSPF Router                                           |                                                                      |
| <b>History</b>            | 3.3.3500                                                     |                                                                      |
| <b>Role</b>               | admin                                                        |                                                                      |
| <b>Example</b>            | switch (config router ospf)# summary-address 10.10.10.10 /24 |                                                                      |
| <b>Related Commands</b>   | N/A                                                          |                                                                      |
| <b>Note</b>               | Maximum of 1500 summarized IP addresses can be configured.   |                                                                      |

### 6.3.5.3 Interface

## ip ospf cost

**ip ospf cost <cost>**  
**no ip ospf cost <cost>**

Sets OSPF cost of sending packet of this interface.  
 The no form of the command resets this parameter to default.

|                           |                                                                                                                                             |                                                        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Syntax Description</b> | cost                                                                                                                                        | The Interface cost used by the OSPF. Range is 1-65535. |
| <b>Default</b>            | 1                                                                                                                                           |                                                        |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                        |
| <b>History</b>            | 3.3.3500                                                                                                                                    |                                                        |
| <b>Role</b>               | admin                                                                                                                                       |                                                        |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf cost 100                                                                                         |                                                        |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                        |
| <b>Note</b>               |                                                                                                                                             |                                                        |



## ip ospf dead-interval

**ip ospf dead-interval <seconds>**

**no ip ospf dead-interval**

Configures the interval during which at least one Hello packet must be received from a neighbor before the router declares that neighbor as down.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                                                        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                     | The dead-interval timer, in seconds. Range is 1-65535. |
| <b>Default</b>            | 40                                                                                                                                          |                                                        |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                        |
| <b>History</b>            | 3.3.3500                                                                                                                                    |                                                        |
| <b>Role</b>               | admin                                                                                                                                       |                                                        |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf dead-interval 10                                                                                 |                                                        |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                        |
| <b>Note</b>               | The value must be the same for all nodes on the network.                                                                                    |                                                        |

## ip ospf hello-interval

**ip ospf hello-interval <seconds>**

**no ip ospf hello-interval**

Configures the interval between Hello packets that OSPF sends on the interface.  
The no form of the command resets this parameter to default.

|                           |                                                                                                                                             |                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                     | The Hello interval timer, in seconds. Range is 1-65535. |
| <b>Default</b>            | 10                                                                                                                                          |                                                         |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                         |
| <b>History</b>            | 3.3.3500                                                                                                                                    |                                                         |
| <b>Role</b>               | admin                                                                                                                                       |                                                         |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf hello-interval 20                                                                                |                                                         |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                         |
| <b>Note</b>               | The value must be the same for all nodes on the network.                                                                                    |                                                         |

## ip ospf priority

**ip ospf priority <number>**

**no ip ospf priority**

Configures the priority for this OSPF interface.

The no form of the command resets this parameter to default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                     |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The Interface priority used by the OSPF protocol.<br>Range is 0-255 |
| <b>Default</b>            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                     |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                                                                                                                                                                                                                      |                                                                     |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                     |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf priority 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                     |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Use the “ip ospf priority” command to set the router priority, which determines the designated router for this network. When two routers are attached to a network, both attempt to become the designated router.</li> <li>The router with the higher router priority takes precedence. If there is a tie, the router with the higher router ID takes precedence. A router with a router priority set to zero cannot become the designated router or backup designated router.</li> </ul> |                                                                     |

## ip ospf network

**ip ospf network <type>**

**no ip ospf network**

Sets the OSPF interface network type.

The no form of the command resets the interface network type to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                      |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The network type on this interface. The options are 'broadcast' or 'point-to-point'. |
| <b>Default</b>            | broadcast                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                                                                                                                                                                                                                                                         |                                                                                      |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                      |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf network point-to-point                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The network type influences the behavior of the OSPF interface. An OSPF network type is usually broadcast, which uses OSPF multicasting capabilities. Under this network type, a designated router and backup designated router are elected. For point-to-point networks, there are only two neighbors and multicast is not required.</li> <li>All routers on the same network should have the same network type.</li> </ul> |                                                                                      |

## ip ospf retransmit-interval

**ip ospf retransmit-interval <seconds>**

**no ip ospf retransmit-interval**

Configures the time between OSPF link-state advertisement (LSA) retransmissions for adjacencies that belongs to the interface.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                                                      |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                     | The retransmit interval in seconds. Range is 0-3600. |
| <b>Default</b>            | 5                                                                                                                                           |                                                      |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                      |
| <b>History</b>            | 3.3.3500                                                                                                                                    |                                                      |
| <b>Role</b>               | admin                                                                                                                                       |                                                      |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf retransmit-interval 10                                                                           |                                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                      |
| <b>Note</b>               |                                                                                                                                             |                                                      |

## ip ospf passive-interface

**ip ospf passive-interface**  
**no ip ospf passive-interface**

Suppresses flooding of OSPF routing updates on an interface.  
 The no form of the command reverts the status to active OSPF interface.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Active interface (no ip ospf passive-interface)                                                                                             |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.3500                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf passive-interface                                                                                |
| <b>Related Commands</b>   | N/A                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                             |

## ip ospf transmit-delay

**ip ospf transmit-delay <seconds>**

**no ip ospf transmit-delay**

Sets the estimated time required to send an OSPF link-state update packet.  
The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                                                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                     | The transmit-delay interval in seconds. Range is 0-3600. |
| <b>Default</b>            | 1                                                                                                                                           |                                                          |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                          |
| <b>History</b>            | 3.3.3500                                                                                                                                    |                                                          |
| <b>Role</b>               | admin                                                                                                                                       |                                                          |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf transmit-delay 2                                                                                 |                                                          |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                          |
| <b>Note</b>               |                                                                                                                                             |                                                          |

## ip ospf shutdown

**ip ospf shutdown**  
**no ip ospf shutdown**

Disables the OSPF instance on the interface.  
 The no form of the command enables the OSPF on this interface.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Enabled (no shutdown)                                                                                                                       |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.3500                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf shutdown                                                                                         |
| <b>Related Commands</b>   | N/A                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                             |



## ip ospf authentication

**ip ospf authentication [message-digest]**  
**no ip ospf authentication**

Specifies the authentication type for OSPF.  
 The no form of the command disables the authentication.

|                           |                                                                                                                                                                                                                    |                                                             |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Syntax Description</b> | message-digest                                                                                                                                                                                                     | Specifies that message-digest authentication (MD5) is used. |
| <b>Default</b>            | Disabled (no)                                                                                                                                                                                                      |                                                             |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                        |                                                             |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                           |                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                              |                                                             |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf authentication                                                                                                                                                          |                                                             |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                |                                                             |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Without message-digest option, a simple password authentication will be used.</li> <li>Message-digest authentication can be enabled only if a key is configured.</li> </ul> |                                                             |

## ip ospf authentication-key

**ip ospf authentication-key [auth-type] <password>**  
**no ip ospf authentication-key**

To assign a password for simple password authentication for the OSPF.  
 The no form of the command deletes the simple password authentication key.

|                           |                                                                                                                                                                                                                    |                                                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | auth-type                                                                                                                                                                                                          | The authentication type:<br>0 - Unencrypted password<br>7 - MD5 key |
|                           | password                                                                                                                                                                                                           | Authentication password, up to 8 alphanumeric string.               |
| <b>Default</b>            | Unencrypted password                                                                                                                                                                                               |                                                                     |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                        |                                                                     |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                           |                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                              |                                                                     |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf authentication-key 7 mypass-<br>word                                                                                                                                    |                                                                     |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                |                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Without message-digest option, a simple password authentication will be used.</li> <li>Message-digest authentication can be enabled only if a key is configured.</li> </ul> |                                                                     |

## ip ospf message-digest-key

**ip ospf message-digest-key <key-id> md5 [auth-type] <key>**  
**no ip ospf message-digest-key <key-id>**

Sets the message digest key for MD5 authentication.  
 The no form of the command deletes the key for MD5 authentication.

|                           |                                                                                                                                             |                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | auth-type                                                                                                                                   | The authentication type:<br>0 - Unencrypted password<br>7 - MD5 key |
|                           | key                                                                                                                                         | Authentication password, up to 8 alphanumeric string.               |
|                           | key-id                                                                                                                                      | Alphanumeric password of up to 16 bytes.                            |
| <b>Default</b>            | Unencrypted (no)                                                                                                                            |                                                                     |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                     |
| <b>History</b>            | 3.3.3500                                                                                                                                    |                                                                     |
| <b>Role</b>               | admin                                                                                                                                       |                                                                     |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf message-digest-key mykeyid<br>md5 7 mykey                                                        |                                                                     |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                                     |
| <b>Note</b>               | The user cannot delete the last key until authentication is disabled.                                                                       |                                                                     |

## ip ospf area

**ip ospf area <area-id>**

**no ip ospf area**

Sets OSPF area of this interface (and creates the area if non-existent).  
The no form of the command removes the interface from the area.

|                           |                                                                                                                                                                          |                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | area-id                                                                                                                                                                  | OSPF area ID. Range is 0-4294967295. |
| <b>Default</b>            | N/A                                                                                                                                                                      |                                      |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port<br>Config Interface Loopback |                                      |
| <b>History</b>            | 3.3.3500                                                                                                                                                                 |                                      |
| <b>Role</b>               | admin                                                                                                                                                                    |                                      |
| <b>Example</b>            | switch (config interface vlan 10)# ip ospf area 0                                                                                                                        |                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                      |                                      |
| <b>Note</b>               |                                                                                                                                                                          |                                      |

## 6.3.5.4 Show

### show ip ospf

#### show ip ospf

Displays general OSPF configuration and status.

|                           |                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                      |
| <b>History</b>            | 3.3.3500                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                 |
| <b>Example</b>            | switch (config)# show ip ospf<br>Routing Process 201 with ID 192.0.2.1 VRF default<br>Admin Status is Enabled<br>Stateful High Availability enabled<br>Graceful-restart is configured |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                   |
| <b>Note</b>               |                                                                                                                                                                                       |

## show ip ospf border-routers

### show ip ospf border-routers

Displays routing table entries to an Area Border Routers.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch# show ip ospf border-routers OSPF Process ID p1, vrf default Internal Routing Table Codes: i - Intra-area route, I - Inter-area route i 40.40.40.40 [10], ABR, Area 0.0.0.0, SPF 71 via     192.0.2.1, Ethernet2/1 i 60.60.60.60 [20], ABR, Area 0.0.0.0, SPF 71 via     192.0.2.1, Ethernet2/1 i 40.40.40.40 [10], ABR, Area 0.0.0.1, SPF 71 via     192.0.2.1, Ethernet2/2 i 60.60.60.60 [20], ABR, Area 0.0.0.1, SPF 71 via     192.0.2.1, Ethernet2/2</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## show ip ospf database

**show ip ospf database [summary] [<area-id> [<link-state-id>]] [adv-router <ip-address> | self-originated]**

Displays the OSPF database.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | adv-router <ip-address>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Filters per advertize router                                 |
|                           | area-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Filters the command per OSPF area-id. Range is 0-4294967295. |
|                           | link-state-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The link state ID                                            |
|                           | self-originated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Self Originate                                               |
|                           | summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Summarizes the output of the OSPF database.                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                              |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Example</b>            | <pre>Router# show ip ospf database OSPF Router with ID (50.50.50.50) (Process ID p1) Router Link States (Area 0) Link ID ADV Router Age Seq# Checksum Link Count 40.40.40.40 40.40.40.40 930 0x80000004 0x2ea1 3 50.50.50.50 50.50.50.50 935 0x80000002 0x8b52 1 60.60.60.60 60.60.60.60 943 0x800003c5 0x9854 2 Network Link States (Area 0) Link ID ADV Router Age Seq# Checksum 209.165.201.3 60.60.60.60 944 0x80000001 0x7179 192.0.2.1 50.50.50.50 935 0x80000001 0x516a Summary Network Link States (Area 0) Link ID ADV Router Age Seq# Checksum 209.165.201.1 40.40.40.40 929 0x80000001 0x2498 209.165.201.1 50.50.50.50 928 0x80000001 0x5b2f 209.165.201.1 60.60.60.60 1265 0x800003c3 0xf49b 192.0.2.0 40.40.40.40 943 0x80000001 0x53f3 192.0.2.0 50.50.50.50 935 0x80000001 0x26f8 192.0.2.0 60.60.60.60 930 0x80000001 0x7b51</pre> |                                                              |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                              |

## show ip ospf interface

**show ip ospf interface [vlan <vlan-id>] [brief]**

Displays the OSPF related interface configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gives a brief summary of the output.                                 |
|                           | vlan <vlan-id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Displays OSPF interface configuration and status per VLAN interface. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                      |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                      |
| <b>Example</b>            | <pre>switch# show ip ospf interface ethernet 1/5 Ethernet1/5 is up, line protocol is down IP address 192.0.2.1, Process ID 201 VRF RemoteOfficeVRF, area 0.0.0.10 Enabled by interface configuration State DOWN, Network type BROADCAST, cost 4 Index 1, Transmit delay 1 sec, Router Priority 1 No designated router on this network No backup designated router on this network 0 Neighbors, flooding to 0, adjacent with 0 Timer intervals: Hello 10, Dead 40, Wait 40, Retransmit 5 No authentication Number of opaque link LSAs: 0, checksum sum 0 switch#</pre> <p>This example shows how to display OSPF information in a brief format:</p> <pre>switch# show ip ospf interface brief OSPF Process ID 201 VRF default Total number of interface: 1 Interface ID Area Cost State Neighbors Status VL1 2 0.0.0.0 65535 DOWN 0 down switch#</pre> |                                                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                      |



## show ip ospf neighbors

**show ip ospf neighbors [vlan <vlan-id>] [<neighbor-id>]**

Displays the OSPF related interface neighbor configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | vlan <vlan-id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Displays OSPF interface configuration and status per VLAN interface. |
|                           | neighbor-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Filers the output per a specific OSPF neighbor.                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                      |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                      |
| <b>Example</b>            | <pre>Router# show ip ospf neighbors 10.199.199.137 Neighbor 10.199.199.137, interface address 192.0.2.37 In the area 0.0.0.0 via interface Ethernet2/1 Neighbor priority is 1, State is FULL Options 2 Dead timer due in 0:00:32 Link State retransmission due in 0:00:04 Neighbor 10.199.199.137, interface address 209.165.201.189 In the area 0.0.0.0 via interface Ethernet4/3 Neighbor priority is 5, State is FULL Options 2 Dead timer due in 0:00:32 Link State retransmission due in 0:00:03</pre> <p>This example shows how to display the neighbors that match the neighbor ID on an interface:</p> <pre>Router# show ip ospf neighbors ethernet 2/1 10.199.199.137 Neighbor 10.199.199.137, interface address 192.0.2.37 In the area 0.0.0.0 via interface Ethernet2/1 Neighbor priority is 1, State is FULL Options 2 Dead timer due in 0:00:37 Link State retransmission due in 0:00:04</pre> <p>This example shows how to display detailed information about OSPF neighbors:</p> <pre>Router# show ip ospf neighbors detail Neighbor 192.168.5.2, interface address 10.225.200.28 In the area 0 via interface GigabitEthernet1/0/0 Neighbor priority is 1, State is FULL, 6 state changes DR is 10.225.200.28 BDR is 10.225.200.30 Options is 0x42 LLS Options is 0x1 (LR), last OOB-Resync 00:03:08 ago Dead timer due in 00:00:36 Neighbor is up for 00:09:46 Index 1/1, retransmission queue length 0, number of retransmission 1 First 0x0(0)/0x0(0) Next 0x0(0)/0x0(0) Last retransmission scan length is 1, maximum is 1 Last retransmission scan time is 0 msec, maximum is 0 msec</pre> |                                                                      |

|                         |     |
|-------------------------|-----|
| <b>Related Commands</b> | N/A |
|-------------------------|-----|

|             |
|-------------|
| <b>Note</b> |
|-------------|

## show ip ospf request-list

**show ip ospf request-list <neighbor-id> vlan <vlan-id>**

Displays the OSPF list of all link-state advertisements (LSAs) requested by a router.

|                           |                                                                                                                                                                                                                                                                |                                                 |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Syntax Description</b> | neighbor-id                                                                                                                                                                                                                                                    | Filers the output per a specific OSPF neighbor. |
|                           | vlan-id                                                                                                                                                                                                                                                        | Filers the output per a specific VLAN ID.       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                            |                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                               |                                                 |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                       |                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                          |                                                 |
| <b>Example</b>            | <pre>Router# show ip ospf request-list 40.40.40 ethernet 2/1 OSPF Process ID p1 Neighbor 40.40.40.40, interface Ethernet2/1, address 192.0.2.1 1 LSAs on request-list Type LS ID ADV RTR Seq NO Age Checksum 1 192.0.2.12 192.0.2.12 0x8000020D 8 0x6572</pre> |                                                 |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                            |                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                |                                                 |

## show ip ospf retransmission-list

**show ip ospf retransmission-list <neighbor-id> vlan <vlan-id>**

Displays the OSPF list of all link-state advertisements (LSAs) waiting to be resent to neighbors.

|                           |                                                                                                                                                                                                                                                                                                                                             |                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Syntax Description</b> | neighbor-id                                                                                                                                                                                                                                                                                                                                 | Filers the output per a specific OSPF neighbor. |
|                           | vlan-id                                                                                                                                                                                                                                                                                                                                     | Filers the output per a specific VLAN ID.       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                            |                                                 |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                    |                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                       |                                                 |
| <b>Example</b>            | <pre>Router# show ip ospf retransmission-list 192.0.2.11 ethernet 2/1 OSPF Router with ID (192.0.2.12) (Process ID 1) Neighbor 192.0.2.11, interface Ethernet2/1 address 209.165.201.11 Link state retransmission due in 3764 msec, Queue length 2 Type LS ID ADV RTR Seq NO Age Checksum 1 192.0.2.12 192.0.2.12 0x80000210 0 0xB196</pre> |                                                 |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                             |                                                 |

## show ip ospf summary-address

### show ip ospf summary-address

Displays a list of all summary address redistribution information configured on the OSPF.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.3.3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config)# show ip ospf summary-address</pre> <p>Display of Summary addresses for External Routes and area ranges for the summary LSAs</p> <pre>OSPF Process default OSPF External Summary Address and area-range Configuration Information</pre> <pre>----- Network Mask          Area          Advertise    LSA type Metric Tag ----- 1.1.1.1 255.255.255.0  NA          Advertise    Type5      10      0 2.2.2.0 255.255.255.0  10.10.10.10 Not Advertise Type3      10      0</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## 6.4 BGP

Border Gateway Protocol (BGP) is an exterior gateway protocol which is designed to transfer routing information between routers. It maintains and propagates a table of routes which designates network reachability among autonomous systems (ASs).

BGP neighbors, or peers, are routers configured manually to converse using the BGP protocol on top of a TCP session on port 179. A BGP speaker periodically sends keep-alive messages to maintain the connection. Network reachability includes such information as forwarding destinations (IPv4 or IPv6) together with a list of ASs that this information traverses and other attributes, so it becomes possible to construct a graph of AS connectivity without routing loops. BGP makes possible to apply policy rules to enforce connectivity graph.

BGP routers communicate through TCP connection on port 179. Connection between BGP neighbors is configured manually or can be established dynamically by configuring dynamic listen groups. When BGP runs between two peers in the same AS, it is referred to as Internal BGP (iBGP, or Interior Border Gateway Protocol). When it runs between separate ASs, it is called External BGP (eBGP, or Exterior Border Gateway Protocol). Both sides can initiate a connection, after the initial connectivity is created, BGP state machine drives both sides to enter into ESTABLISHED state where they can exchange UPDATE messages with reachability information.

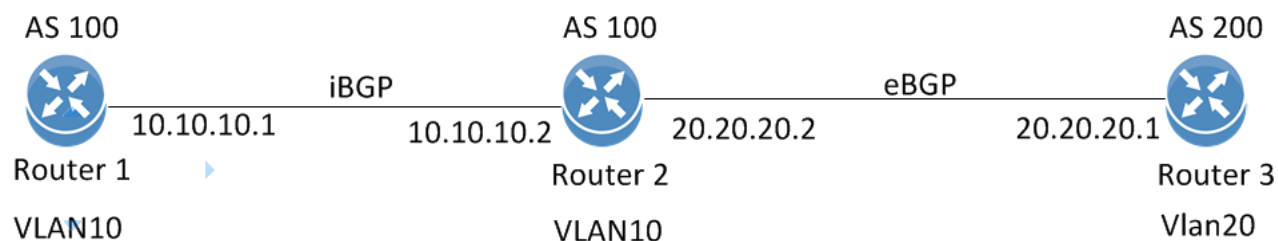
### 6.4.1 State Machine

In order to make decisions in its operations with peers, a BGP peer uses a simple finite state machine (FSM) that consists of six states: Idle; Connect; Active; OpenSent; OpenConfirm; and Established. For each peer-to-peer session, a BGP implementation maintains a state variable that tracks which of these six states the session is in. The BGP protocol defines the messages that each peer should exchange in order to change the session from one state to another.

The first state is the “Idle” state. In “Idle” state, BGP initializes all resources, refuses all inbound BGP connection attempts and initiates a TCP connection to the peer. The second state is “Connect”. In the “Connect” state, the router awaits the TCP connection to complete and transitions to the “OpenSent” state if successful. If unsuccessful, it initializes the ConnectRetry timer and transitions to the “Active” state upon expiration. In the “Active” state, the router resets the ConnectRetry timer to zero and returns to the “Connect” state. In the “OpenSent” state, the router sends an Open message and waits for one in return in order to transition to the “OpenConfirm” state. KeepAlive messages are exchanged and, upon successful receipt, the router is placed into the “Established” state. In the “Established” state, the router can send/receive: KeepAlive; Update; and Notification messages to/from its peer.

### 6.4.2 Configuring BGP

**Figure 34: Basic BGP Configuration**



Follow these steps for basic BGP configuration on two switches (Router 1 and Router 2):

Preconditions:

**Step 1.** Make sure the license installed supports L3.

**Step 2.** Enable IP routing functionality. Run:

```
switch (config)# ip routing
```

**Step 3.** Enable the desired VLAN. Run:

```
switch (config)# vlan 10
```



The same VLAN must be configured on both switches.

**Step 4.** Add this VLAN to the desired interface. Run:

```
switch (config)# interface ethernet 1/1
switch (config ethernet 1/1)# switchport access vlan 10
```

**Step 5.** Create a VLAN interface. Run:

```
switch (config)# interface vlan 10
```

**Step 6.** Apply IP address to the VLAN interface on Router 1. Run:

```
switch (config interface vlan 10)# ip address 10.10.10.1 /24
```

**Step 7.** Apply IP address to the VLAN interface on Router 2. Run:

```
switch (config interface vlan 10)# ip address 10.10.10.2 /24
```

**Step 8.** Enable the interface. Run:

```
switch (config interface vlan 10)# no shutdown
```

Configure BGP:

**Step 1.** Enable BGP. Run:

```
switch (config)# protocol bgp
```

**Step 2.** Configure an AS number that identifies the BGP router. Run:

```
switch (config)# router bgp 100
```



To run iBGP, the AS number of all remote neighbors should be similar to the local AS number of the configured router.

**Step 3.** Configure BGP Router 1 neighbor. Run:

```
switch (config router bgp 100)# neighbor 10.10.10.2 remote-as 100
```

**Step 4.** Configure BGP Router 2 neighbor. Run:

```
switch (config router bgp 100)# neighbor 10.10.10.1 remote-as 100
```

### 6.4.3 Verifying BGP

**Step 1.** Check the general status of BGP. Run:

```
switch (config)# show ip bgp summary
BGP router identifier 10.10.10.1, local AS number 100
BGP table version is 100, main routing table version 100
0 network entries using 0 bytes of memory
0 path entries using 0 bytes of memory
0 BGP AS-PATH entries using 0 bytes of memory
0 BGP community entries using 0 bytes of memory
0 BGP extended community entries using 0 bytes of memory
Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
10.10.10.2 0 100 100 76 3 0 0 00:0:10:19 ESTABLISHED
switch (config)#
BGP summary information for VRF default, address family IPv4
```

- Verify that the state of each BGP neighbor reached to ESTABLISHED state.
- In case the neighbor is disabled (shutdown). The state of the neighbor will be IDLE.
- BGP incoming and outgoing messages should be incremented.
- The AS number of each neighbor is the correct one.

**Step 2.** Check the status of the neighbors. Run:

```
switch (config)# show ip bgp neighbors
BGP neighbor is 10.10.10.2, remote AS 100, external link
 BGP version 0, remote router ID 0.0.0.0
 BGP State = ESTABLISHED
 Last read 0:00:00:00, last write 0:00:00:00, hold time is 180, keepalive
interval is 60 seconds
 Configured hold time is 180, keepalive interval is 60 seconds
 Minimum holdtime from neighbor is 0 seconds
switch (config)#
```

You should be able to see running BGP counters and ESTABLISHED state per active neighbor.



## 6.4.4 Commands

### 6.4.4.1 Config

#### protocol bgp

**protocol bgp**  
**no protocol bgp**

Enables BGP feature, and unhides BGP related commands.  
The no form of the command deletes all BGP configuration and hides BGP related commands.

|                           |                                                   |
|---------------------------|---------------------------------------------------|
| <b>Syntax Description</b> | N/A                                               |
| <b>Default</b>            | Disabled                                          |
| <b>Configuration Mode</b> | Config                                            |
| <b>History</b>            | 3.3.5006                                          |
| <b>Role</b>               | admin                                             |
| <b>Example</b>            | switch (config)# protocol bgp<br>switch (config)# |
| <b>Related Commands</b>   | ip routing                                        |
| <b>Note</b>               |                                                   |

## clear ip bgp

**clear ip bgp [{<ip-address> | all} [soft] [in | out]]**

Clears BGP learned routes from the BGP table and resets the connection to the neighbor.

|                           |                                                                                                                                                           |                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                | A BGP peer IP address. Only the specified neighbor is reset.                                   |
|                           | all                                                                                                                                                       | All BGP peers. All BGP neighbors are reset.                                                    |
|                           | soft                                                                                                                                                      | Clears BGP learned routes from the BGP table without resetting the connection to the neighbor. |
|                           | in                                                                                                                                                        | Inbound routes are reset.                                                                      |
|                           | out                                                                                                                                                       | Outbound routes are reset.                                                                     |
| <b>Default</b>            | N/A                                                                                                                                                       |                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                    |                                                                                                |
| <b>History</b>            | 3.3.5006                                                                                                                                                  | First release                                                                                  |
|                           | 3.3.5200                                                                                                                                                  | Updated description                                                                            |
| <b>Role</b>               | admin                                                                                                                                                     |                                                                                                |
| <b>Example</b>            | switch (config)# clear ip bgp all<br>switch (config)#                                                                                                     |                                                                                                |
| <b>Related Commands</b>   | N/A                                                                                                                                                       |                                                                                                |
| <b>Note</b>               | This command removes BGP IPv4 learned routes from the routing table, reads all routes from designated peers, and sends routes to those peers as required. |                                                                                                |

## router bgp

**router bgp <as-number>**  
**no router bgp <as-number>**

Creates and enters a BGP instance with the specified AS number.  
 The no form of the command deletes all router BGP instance configuration.

|                           |                                                                    |                                                                                                                                                                                                             |
|---------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | as-number                                                          | Autonomous system number: A unique number to be used to identify the AS. The AS is a number which identifies the BGP router to other routers and tags the routing information passed along. Range: 1-65535. |
| <b>Default</b>            | N/A                                                                |                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config                                                             |                                                                                                                                                                                                             |
| <b>History</b>            | 3.3.5006                                                           | First version                                                                                                                                                                                               |
|                           | 3.3.5200                                                           | Updated syntax description                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                              |                                                                                                                                                                                                             |
| <b>Example</b>            | switch (config)# router bgp 100<br>switch (config router bgp 100)# |                                                                                                                                                                                                             |
| <b>Related Commands</b>   | ip routing                                                         |                                                                                                                                                                                                             |
| <b>Note</b>               |                                                                    |                                                                                                                                                                                                             |

## 6.4.4.2 Config Router

### shutdown

**shutdown**  
**no shutdown**

Gracefully disables BGP protocol without removing existing configuration.  
The no form of the command enables BGP.

|                           |                                             |
|---------------------------|---------------------------------------------|
| <b>Syntax Description</b> | N/A                                         |
| <b>Default</b>            | Enabled                                     |
| <b>Configuration Mode</b> | Config Router BGP                           |
| <b>History</b>            | 3.3.5006                                    |
| <b>Role</b>               | admin                                       |
| <b>Example</b>            | switch (config router bgp 100)# no shutdown |
| <b>Related Commands</b>   |                                             |
| <b>Note</b>               |                                             |

## aggregate-address

**aggregate-address** <prefix> [summary-only] [as-set] [attribute-map]  
**no aggregate-address** <prefix> [summary-only] [as-set] [attribute-map]

Creates an aggregate route in the BGP database.  
 The no form of the command disables ECMP across AS paths.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | prefix                                                                                                                                                                                                                                                                                                                                                                                                   | Destination to aggregate                                                                                                             |
|                           | summary-only                                                                                                                                                                                                                                                                                                                                                                                             | Contributor routes are not advertised.                                                                                               |
|                           | as-set                                                                                                                                                                                                                                                                                                                                                                                                   | Includes AS_PATH information from contributor routes as AS_SET attributes                                                            |
|                           | attribute-map                                                                                                                                                                                                                                                                                                                                                                                            | Assigns attribute values in set commands of the map's permit clauses. Deny clauses and match commands in permit clauses are ignored. |
| <b>Default</b>            | Disabled                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                      |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                      |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                      |
| <b>Example</b>            | switch-e07c04 [standalone: master] (config router bgp 4) # aggregate-address 3.5.3.7 /32                                                                                                                                                                                                                                                                                                                 |                                                                                                                                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Aggregate routes combine the characteristics of multiple routes into a single route that the switch advertises</li> <li>Aggregation can reduce the amount of information that a BGP speaker is required to store and transmit when advertising routes to other BGP speakers</li> <li>Aggregate routes are advertised only after they are redistributed</li> </ul> |                                                                                                                                      |

## bestpath as-path multipath-relax

**bestpath as-path multipath-relax**  
**no bestpath as-path multipath-relax**

Enables ECMP across AS paths.  
 The no form of the command disables ECMP across AS paths.

|                           |                                                                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | Disabled                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                    |
|                           | 3.3.5200 Updated description and notes                                                                                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | switch (config router bgp 100)# bestpath as-path multipath-relax                                                                                                                                                                                                                                            |
| <b>Related Commands</b>   | maximum-paths                                                                                                                                                                                                                                                                                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• With this option disabled, only routes with exactly the same AS path as the best route to a destination are considered for ECMP.</li> <li>• With this option enabled, all routes with similar length AS path as the best route are considered for ECMP.</li> </ul> |

## bgp fast-external-fallover

**bgp fast-external-fallover**  
**no bgp fast-external-fallover**

Terminates eBGP sessions of any directly adjacent peer without waiting for the hold-down timer to expire if the link used to reach the peer goes down.  
 The no form of the command waits for hold-down timer to expire before terminating eBGP sessions.

|                           |                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                         |
| <b>Default</b>            | no bgp fast-external-fallover                                                                                               |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                           |
| <b>History</b>            | 3.4.0000                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                       |
| <b>Example</b>            | switch (config router bgp 100)# bgp fast-external-fallover                                                                  |
| <b>Related Commands</b>   | maximum-paths                                                                                                               |
| <b>Note</b>               | Although this feature improves BGP conversion time, it may cause instability in your BGP table due to a flapping interface. |

## bgp listen limit

**bgp listen limit <maximum>**  
**no bgp listen limit**

Limits the number of dynamic BGP peers allowed on the switch.  
 The no form of the command resets to the default value.

|                           |                                                      |                                                                                    |
|---------------------------|------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | maximum                                              | The maximum number of dynamic BGP peers to be allowed on the switch. Range: 1-128. |
| <b>Default</b>            | 100                                                  |                                                                                    |
| <b>Configuration Mode</b> | Config Router BGP                                    |                                                                                    |
| <b>History</b>            | 3.4.0000                                             |                                                                                    |
| <b>Role</b>               | admin                                                |                                                                                    |
| <b>Example</b>            | switch (config router bgp 100)# bgp listen limit 101 |                                                                                    |
| <b>Related Commands</b>   |                                                      |                                                                                    |
| <b>Note</b>               |                                                      |                                                                                    |



## bgp listen range

**bgp listen range** <ip-prefix> <length> peer-group <peer-group-name> remote-as <as-number>

**no bgp listen range** <ip-prefix> <length>

Identifies a range of IP addresses from which the switch will accept incoming dynamic BGP peering requests.

After applying the no form of the command, the switch will no longer accept dynamic peering requests on the range.

|                    |                                                                                                                                                                                                                                   |                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Syntax Description | ip-prefix                                                                                                                                                                                                                         | IP address                                |
|                    | length                                                                                                                                                                                                                            | Mask length (e.g. /24 or 255.255.255.254) |
|                    | peer-group-name                                                                                                                                                                                                                   | Peer group name                           |
|                    | remote-as <as-number>                                                                                                                                                                                                             | Remote peer’s number.                     |
| Default            | 100                                                                                                                                                                                                                               |                                           |
| Configuration Mode | Config Router BGP                                                                                                                                                                                                                 |                                           |
| History            | 3.4.0000                                                                                                                                                                                                                          |                                           |
| Role               | admin                                                                                                                                                                                                                             |                                           |
| Example            | switch (config router bgp 100)# bgp listen range 10.10.10.10 /24 peer-group my-group remote-as 13                                                                                                                                 |                                           |
| Related Commands   |                                                                                                                                                                                                                                   |                                           |
| Note               | <ul style="list-style-type: none"><li>• To create a static peer group, use the command neighbor peer-group</li><li>• Neighbors in a dynamic peer group are configured as a group and cannot be configured individually.</li></ul> |                                           |

## bgp redistribute-internal

**bgp redistribute-internal**  
**no bgp redistribute-internal**

Enables iBGP redistribution into an interior gateway protocol (IGP).  
 The no form of the command disables iBGP redistribution into an interior gateway protocol (IGP).

|                           |                                                           |                                           |
|---------------------------|-----------------------------------------------------------|-------------------------------------------|
| <b>Syntax Description</b> | ip-prefix                                                 | IP address                                |
|                           | length                                                    | Mask length (e.g. /24 or 255.255.255.254) |
|                           | peer-group-name                                           | Peer group name                           |
|                           | remote-as <as-number>                                     | Remote peer's number.                     |
| <b>Default</b>            | Disabled                                                  |                                           |
| <b>Configuration Mode</b> | Config Router BGP                                         |                                           |
| <b>History</b>            | 3.4.0000                                                  |                                           |
| <b>Role</b>               | admin                                                     |                                           |
| <b>Example</b>            | switch (config router bgp 100)# bgp redistribute-internal |                                           |
| <b>Related Commands</b>   |                                                           |                                           |
| <b>Note</b>               |                                                           |                                           |

## cluster-id

**cluster-id <ip-address>**  
**no cluster-id <ip-address>**

Configures the cluster ID in a cluster with multiple route reflectors.  
 The no form of the command resets the cluster ID for route reflector.

|                           |                                                        |                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                             | The route reflector cluster ID <ul style="list-style-type: none"> <li>• 0.0.0.1 to 255.255.255.255 Valid cluster ID number</li> <li>• 0.0.0.0 removes the cluster-ID from the switch (similar to “no cluster-id”)</li> </ul> |
| <b>Default</b>            | Cluster ID is the same as Router ID                    |                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config Router BGP                                      |                                                                                                                                                                                                                              |
| <b>History</b>            | 3.2.1000                                               | First version                                                                                                                                                                                                                |
|                           | 3.4.0000                                               | Updated syntax description                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                  |                                                                                                                                                                                                                              |
| <b>Example</b>            | switch (config router bgp 100)# cluster-id 10.10.10.10 |                                                                                                                                                                                                                              |
| <b>Related Commands</b>   | N/A                                                    |                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                        |                                                                                                                                                                                                                              |

## client-to-client reflection

**client-to-client reflection**  
**no client-to-client reflection**

The switch will be configured as a route reflector.  
The no form of the command stops the switch from being a route reflector

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                         |
| <b>Default</b>            | client-to-client reflection is enabled                      |
| <b>Configuration Mode</b> | Config Router BGP                                           |
| <b>History</b>            | 3.2.1000                                                    |
| <b>Role</b>               | admin                                                       |
| <b>Example</b>            | switch (config router bgp 100)# client-to-client reflection |
| <b>Related Commands</b>   | N/A                                                         |
| <b>Note</b>               |                                                             |

## distance

**distance <external> <internal> <local>**  
**no distance**

Sets the administrative distance of the routes learned through BGP.  
 The no form of the command resets the administrative distance its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | external                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Administrative distance for external BGP routes.<br>Range: 1-255. |
|                           | internal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Administrative distance for internal BGP routes.<br>Range: 1-255. |
|                           | local                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Administrative distance for local BGP routes.<br>Range: 1-255.    |
| <b>Default</b>            | external: 200<br>internal: 200<br>local: 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                   |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                   |
| <b>Example</b>            | switch (config router bgp 100)# distance 10 20 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                   |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Routers use administrative distances to decide on a route when two protocols provide routing information to the same destination.</li> <li>• Lower distance values correspond to higher reliability.</li> <li>• Routes are external when learned from an external autonomous system.</li> <li>• Routes are internal when learned from a peer in the local autonomous system.</li> <li>• Local routes are those networks listed with a network router configuration command, often as back doors, for the router or for the networks being redistributed from another process.</li> <li>• BGP routing tables do not include routes with a distance of 255.</li> </ul> |                                                                   |

## graceful-restart stalepath-time

**graceful-restart stalepath-time <interval>**

**no graceful-restart stalepath-time**

Configures the maximum time that stale routes from a restarting BGP neighbor are retained after a BGP session is reestablished with that peer.

The no form of the command resets to the default value.

|                           |                                                                     |                                 |
|---------------------------|---------------------------------------------------------------------|---------------------------------|
| <b>Syntax Description</b> | interval                                                            | Time in seconds. Range: 1-3600. |
| <b>Default</b>            | 300 seconds                                                         |                                 |
| <b>Configuration Mode</b> | Config Router BGP                                                   |                                 |
| <b>History</b>            | 3.4.0000                                                            |                                 |
| <b>Role</b>               | admin                                                               |                                 |
| <b>Example</b>            | switch (config router bgp 100)# graceful-restart stalepath-time 350 |                                 |
| <b>Related Commands</b>   | N/A                                                                 |                                 |
| <b>Note</b>               |                                                                     |                                 |

## graceful-restart helper

**graceful-restart helper**  
**no graceful-restart helper**

Enables BGP graceful restart helper mode on the switch for all BGP neighbors. The no form of the command disables BGP graceful restart helper mode on the switch for all BGP neighbors.

|                           |                                                                                                                                                                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>            | Graceful restart is enabled                                                                                                                                                                                                                                                                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                   |
| <b>Example</b>            | switch (config router bgp 100)# graceful-restart helper                                                                                                                                                                                                                                                 |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When graceful restart helper mode is enabled, the switch retains routes from neighbors capable of graceful restart while those neighbors are restarting BGP</li> <li>Individual neighbor configuration takes precedence over the global configuration</li> </ul> |

## maximum-paths

### maximum-paths [ibgp] <maximum-path>

Configures the maximum number of parallel eBGP/iBGP routes that the switch installs in the routing table.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | ibgp                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sets the configuration on the internal BGP.           |
|                           | maximum-path                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The number of routes to install to the routing table. |
| <b>Default</b>            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |
|                           | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Updated description and notes                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |
| <b>Example</b>            | <pre>switch (config router bgp 100)# maximum-paths ibgp 10 switch (config router bgp 100)#</pre>                                                                                                                                                                                                                                                                                                                                                                        |                                                       |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This command provides an ECMP parameter that controls the number of equal-cost paths that the switch installs in the routing table for each destination.</li> <li>The action is effective after BGP restart.</li> <li>If the parameter “ibgp” is not used, the setting is applied on routes learned from peers from other ASs; if “ibgp” is used, the setting is applied to routes learned from peers of the same AS.</li> </ul> |                                                       |



## neighbor advertisement-interval

**neighbor {<ip-address> | <peer-group-name>} advertisement-interval <delay>**  
**no neighbor {<ip-address> | <peer-group-name>} advertisement-interval**

Sets the minimum route advertisement interval (MRAI) between the sending of BGP routing updates.

The no form of the command disables this function.

|                           |                                                                                |                                                                |
|---------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                     | A BGP peer IP address                                          |
|                           | peer-group-name                                                                | Peer group name                                                |
|                           | delay                                                                          | Time (in seconds) is specified by an integer.<br>Range: 0-600. |
| <b>Default</b>            | 30 seconds                                                                     |                                                                |
| <b>Configuration Mode</b> | Config Router BGP                                                              |                                                                |
| <b>History</b>            | 3.4.0000                                                                       | First version                                                  |
| <b>Role</b>               | admin                                                                          |                                                                |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 advertisement-interval 90 |                                                                |
| <b>Related Commands</b>   |                                                                                |                                                                |
| <b>Note</b>               |                                                                                |                                                                |

## neighbor allowas-in

**neighbor {<ip-address> | <peer-group-name>} allowas-in [number]**  
**no neighbor {<ip-address> | <peer-group-name>} allowas-in**

Configures the switch to permit the advertisement of prefixes containing duplicate autonomous switch numbers (ASNs).

The no form of the command disables this function.

|                           |                                                                                                                                |                                                           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                     | A BGP peer IP address                                     |
|                           | peer-group-name                                                                                                                | Peer group name                                           |
|                           | number                                                                                                                         | Number of switch's (ASN) allowed in path.<br>Range: 1-10. |
| <b>Default</b>            | N/A                                                                                                                            |                                                           |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                              |                                                           |
| <b>History</b>            | 3.4.0000                                                                                                                       | First version                                             |
| <b>Role</b>               | admin                                                                                                                          |                                                           |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 allowas-in 2                                                              |                                                           |
| <b>Related Commands</b>   | ip routing<br>router bgp <as-number>                                                                                           |                                                           |
| <b>Note</b>               | Neighbors from the same AS as the router are considered as iBGP peers, and neighbors from other ASs are considered eBGP peers. |                                                           |

## neighbor description

**neighbor** {<ip-address> | <peer-group-name>} **description** <string>  
**no neighbor** {<ip-address> | <peer-group-name>} **description**

Associates descriptive text with the specified peer or peer group.  
 The no form of the command removes the description from the peer.

|                           |                                                                                         |                                             |
|---------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                              | IP address of the neighbor.                 |
|                           | peer-group-name                                                                         | Peer group name                             |
|                           | string                                                                                  | Free string, up to 80 characters in length. |
| <b>Default</b>            | No description                                                                          |                                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                       |                                             |
| <b>History</b>            | 3.3.5006                                                                                | First version                               |
|                           | 3.3.5200                                                                                | Updated example                             |
| <b>Role</b>               | admin                                                                                   |                                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 description The next door neighbor |                                             |
| <b>Related Commands</b>   | N/A                                                                                     |                                             |
| <b>Note</b>               | The peer description only appears in the show commands.                                 |                                             |

## neighbor ebgp-multihop

**neighbor** {<ip-address> | <peer-group-name>} **ebgp-multihop** [<ttl>]  
**no neighbor** {<ip-address> | <peer-group-name>} **ebgp-multihop**

Enables BGP to connect to external peers that are not directly connected to the switch.  
 The no form of the command applies the system disables connecting to external peers.

|                           |                                                                                                            |                                         |
|---------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                 | IP address of the BGP-speaking neighbor |
|                           | peer-group-name                                                                                            | Peer group name                         |
|                           | ttl                                                                                                        | Time-to-live. Range: 1-255 hops.        |
| <b>Default</b>            | ttl: 1                                                                                                     |                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                                                          |                                         |
| <b>History</b>            | 3.3.5006                                                                                                   | First version                           |
|                           | 3.3.5200                                                                                                   | Updated default                         |
| <b>Role</b>               | admin                                                                                                      |                                         |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 ebgp-multihop 5                                       |                                         |
| <b>Related Commands</b>   | ip routing<br>neighbor <ip-address> remote-as <as-number>                                                  |                                         |
| <b>Note</b>               | The command does not establish the multi-hop if the only route to the peer is the default route (0.0.0.0). |                                         |

## neighbor export-localpref

**neighbor** {<ip-address> | <peer-group-name>} **export-localpref** <value>  
**no neighbor** {<ip-address> | <peer-group-name>} **export-localpref**

Configures the local preference value sent to the specified peer or peer group.  
 The no form of the command resets the local preference to its default value.

|                           |                                                                           |                                         |
|---------------------------|---------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                | IP address of the BGP-speaking neighbor |
|                           | peer-group-name                                                           | Peer group name                         |
|                           | value                                                                     | Preference value. Range: 0-2147483647.  |
| <b>Default</b>            | 100                                                                       |                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                         |                                         |
| <b>History</b>            | 3.4.0000                                                                  | First version                           |
| <b>Role</b>               | admin                                                                     |                                         |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 export-localpref 100 |                                         |
| <b>Related Commands</b>   |                                                                           |                                         |
| <b>Note</b>               |                                                                           |                                         |

## neighbor graceful-restart helper

**neighbor {<ip-address> | <peer-group-name>} graceful-restart helper**  
**no neighbor {<ip-address> | <peer-group-name>} graceful-restart helper**

Enables BGP graceful restart helper mode for the specified BGP neighbor or peer group.

The no form of the command

|                           |                                                                                                                                                                                                                                                                                                          |                                         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                               | IP address of the BGP-speaking neighbor |
|                           | peer-group-name                                                                                                                                                                                                                                                                                          | Peer group name                         |
| <b>Default</b>            | Graceful restart is enabled                                                                                                                                                                                                                                                                              |                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                        |                                         |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                 | First version                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                    |                                         |
| <b>Example</b>            | switch (config router bgp 100)# neighbor graceful-restart helper                                                                                                                                                                                                                                         |                                         |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                          |                                         |
| <b>Note</b>               | <ul style="list-style-type: none"><li>• When graceful restart helper mode is enabled, the switch retains routes from neighbors capable of graceful restart while those neighbors are restarting BGP</li><li>• Individual neighbor configuration takes precedence over the global configuration</li></ul> |                                         |

## neighbor import-localpref

**neighbor** {<ip-address> | <peer-group-name>} **import-localpref** <value>  
**no neighbor** {<ip-address> | <peer-group-name>} **import-localpref**

Configures the local preference value assigned to routes received from the specified peer or peer group.

The no form of the command resets the local preference to its default value.

|                           |                                                                           |                                         |
|---------------------------|---------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                | IP address of the BGP-speaking neighbor |
|                           | peer-group-name                                                           | Peer group name                         |
|                           | value                                                                     | Preference value. Range: 0-2147483647.  |
| <b>Default</b>            | 100                                                                       |                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                         |                                         |
| <b>History</b>            | 3.4.0000                                                                  | First version                           |
| <b>Role</b>               | admin                                                                     |                                         |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 import-localpref 100 |                                         |
| <b>Related Commands</b>   |                                                                           |                                         |
| <b>Note</b>               |                                                                           |                                         |

## neighbor local-as

**neighbor {<ip-address> | <peer-group-name>} local-as <as-id> [no-prepend | replace-as]**

**no neighbor {<ip-address> | <peer-group-name>} local-as**

Enables the modification of the AS path attribute for routes received from an eBGP neighbor.

The no form of the command disables AS path modification for the specified peer or peer group.

|                           |                                                                                                                                                                                                                                                          |                                                                                                                         |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                               | IP address of the BGP-speaking neighbor                                                                                 |
|                           | peer-group-name                                                                                                                                                                                                                                          | Peer group name                                                                                                         |
|                           | no-prepend                                                                                                                                                                                                                                               | local-as number is not prepended to the routes received from external neighbors                                         |
|                           | replace-as                                                                                                                                                                                                                                               | Prepends only the local autonomous system number (as configured with the IP address argument) to the AS path attribute. |
| <b>Default</b>            | 12000                                                                                                                                                                                                                                                    |                                                                                                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                        |                                                                                                                         |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                 | First version                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                    |                                                                                                                         |
| <b>Example</b>            | switch-e07c04 [standalone: master] (config router bgp 4) # neighbor 100.100.100.100 local-as 123                                                                                                                                                         |                                                                                                                         |
| <b>Related Commands</b>   | ip routing<br>neighbor <ip-address> remote-as <as-number>                                                                                                                                                                                                |                                                                                                                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This function allows the switch to appear as a member of a different autonomous system (AS) to external peers.</li> <li>To disable peering with the neighbor run the command <code>clear ip bgp</code></li> </ul> |                                                                                                                         |



## neighbor maximum-prefix

**neighbor** {<ip-address> | <peer-group-name>} **maximum-prefix** <maximum>  
[warning-only]

**no neighbor** {<ip-address> | <peer-group-name>} **maximum-prefix**

Configures the number of BGP routes the switch accepts from a specified neighbor and defines an action when the limit is exceeded.

The no form of the command removes the limitation

|                           |                                                                                        |                                                                                         |
|---------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                             | IP address of the BGP-speaking neighbor                                                 |
|                           | peer-group-name                                                                        | Peer group name                                                                         |
|                           | maximum                                                                                | Number of BGP routes the switch accepts from a specified neighbor. Range: 1-2147483647. |
|                           | warning-only                                                                           | Only generates a warning rather than disconnecting the neighbor                         |
| <b>Default</b>            | 12000                                                                                  |                                                                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                                      |                                                                                         |
| <b>History</b>            | 3.4.0000                                                                               | First version                                                                           |
| <b>Role</b>               | admin                                                                                  |                                                                                         |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 maximum-prefix 12000 warning-only |                                                                                         |
| <b>Related Commands</b>   | ip routing<br>neighbor <ip-address> remote-as <as-number>                              |                                                                                         |
| <b>Note</b>               |                                                                                        |                                                                                         |

## neighbor next-hop-peer

**neighbor {<ip-address> | <peer-group-name>} next-hop-peer**  
**no neighbor {<ip-address> | <peer-group-name>} next-hop-peer**

Configures the switch to list the peer address as the next hop in routes that it receives from the specified peer BGP-speaking neighbor or members of the specified peer group.

The no form of the command disables this function.

|                           |                                                                                              |                             |
|---------------------------|----------------------------------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                                                   | IP address of the neighbor. |
|                           | peer-group-name                                                                              | Peer group name             |
| <b>Default</b>            | no next-hop-peer                                                                             |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                            |                             |
| <b>History</b>            | 3.3.5006                                                                                     |                             |
| <b>Role</b>               | admin                                                                                        |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 next-hop-peer                           |                             |
| <b>Related Commands</b>   |                                                                                              |                             |
| <b>Note</b>               | This command overrides the next hop for all routes received from this neighbor or peer group |                             |

## neighbor next-hop-self

**neighbor {<ip-address> | <peer-group-name>} next-hop-self**  
**no neighbor {<ip-address> | <peer-group-name>} next-hop-self**

Configures the IP address of the router as the next hop address in routes advertises to the specific neighbor.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                                                                                                                                                                                            |                             |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                 | IP address of the neighbor. |
|                           | peer-group-name                                                                                                                                                                                                                                                                                            | Peer group name             |
| <b>Default</b>            | no next-hop-self                                                                                                                                                                                                                                                                                           |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                          |                             |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                   |                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                      |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 next-hop-self                                                                                                                                                                                                                                         |                             |
| <b>Related Commands</b>   | neighbor <ip-address> remote-as <as-number>                                                                                                                                                                                                                                                                |                             |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This function is used in networks where BGP neighbors do not directly access all other neighbors on the same subnet.</li> <li>In the default state, the next hop is generated based on the IP address and the present next hop in the route information.</li> </ul> |                             |

## neighbor password

**neighbor** {<ip-address> | <peer-group-name>} password [<encryption>]  
<string>

**no neighbor** {<ip-address> | <peer-group-name>} password

Enables authentication on a TCP connection with a BGP peer.  
The no form of the command resets the value to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                    |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                      | IP address of the neighbor                                                                                                                         |
|                           | peer-group-name                                                                                                                                                                                                                                                                                                                                                                                 | Peer group name                                                                                                                                    |
|                           | encryption                                                                                                                                                                                                                                                                                                                                                                                      | Possible values: <ul style="list-style-type: none"> <li>• no parameter – clear text</li> <li>• 0 – clear text</li> <li>• 7 – obfuscated</li> </ul> |
|                           | string                                                                                                                                                                                                                                                                                                                                                                                          | Up to 8 bytes in length                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                    |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                    |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                        | First version                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                    |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 password 7<br>admin123                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Peers must use the same password to ensure communication.</li> <li>• neighbor &lt;ip-address&gt; password 7 &lt;password&gt;' can only accept data that was created using 'show config'.</li> <li>• 'show config' will never show the clear-text password, it will always be obfuscated (and thus displayed using the 'password 7' syntax).</li> </ul> |                                                                                                                                                    |

## neighbor peer-group

1. **neighbor** {<ip-address>} **peer-group** <peer-group-name>
2. **neighbor** {<peer-group-name>} **peer-group**
3. **no neighbor** {<ip-address>} **peer-group** <peer-group-name>
4. **no neighbor** {<peer-group-name>} **peer-group** <peer-group-name>

1. Assigns BGP neighbors to an existing peer group.
2. Creates a peer-group
3. Unassigns BGP neighbors to an existing peer group.
4. Removes a specified neighbor from the peer group

| Syntax Description | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | IP address of the neighbor |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
|                    | peer-group-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Peer group name            |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |
| Configuration Mode | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |
| History            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | First version              |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |
| Example            | switch (config router bgp 100)# neighbor groupA peer-group<br>switch (config router bgp 100)# neighbor 1.2.3.4 peer-group groupA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |
| Note               | <ul style="list-style-type: none"><li>Once a peer group is created, the group name can be used as a parameter in neighbor configuration commands, and the configuration will be applied to all members of the group.</li><li>Settings applied to an individual neighbor in the peer group override group settings.</li><li>A neighbor can only belong to one peer group, so issuing this command for a neighbor that is already a member of another group removes it from that group.</li><li>When a neighbor is removed from a peer group, the neighbor retains the configuration inherited from the peer group.</li></ul> |                            |

## neighbor remote-as

**neighbor {<ip-address>} remote-as <as-number>**  
**no neighbor {<ip-address>} remote-as <as-number>**

Configures a neighbor.

The no form of the command removes the neighbor, dropping the connection and all routes if already connected.

|                           |                                                                                                                                |                                         |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                     | A BGP peer IP address                   |
|                           | peer-group-name                                                                                                                | Peer group name                         |
|                           | as-number                                                                                                                      | The BGP peer as-number. Range: 1-65535. |
| <b>Default</b>            | N/A                                                                                                                            |                                         |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                              |                                         |
| <b>History</b>            | 3.3.5006                                                                                                                       | First version                           |
|                           | 3.3.5200                                                                                                                       | Updated description and note            |
| <b>Role</b>               | admin                                                                                                                          |                                         |
| <b>Example</b>            | <pre>switch (config router bgp 100)# neighbor 10.10.10.10 remote-as 200 switch (config router bgp 100)#</pre>                  |                                         |
| <b>Related Commands</b>   | ip routing<br>router bgp <as-number>                                                                                           |                                         |
| <b>Note</b>               | Neighbors from the same AS as the router are considered as iBGP peers, and neighbors from other ASs are considered eBGP peers. |                                         |

## neighbor remove-private-as

**neighbor {<ip-address> | <peer-group-name>} remove-private-as**  
**no neighbor {<ip-address> | <peer-group-name>} remove-private-as**

Removes private autonomous system numbers from outbound routing updates for external BGP (eBGP) neighbors.

The no form of the command preserves private AS numbers for the specified peer.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | A BGP peer IP address |
|                           | peer-group-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Peer group name       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | First version         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| <b>Example</b>            | <pre>switch (config router bgp 100)# neighbor 10.10.10.10 remove-private-as switch (config router bgp 100)#</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| <b>Related Commands</b>   | ip routing<br>router bgp <as-number>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This can only be used with external BGP (eBGP) peers.</li> <li>• If the update has only private AS numbers in the AS path, BGP removes these numbers.</li> <li>• If the AS path includes both private and public AS numbers, BGP does not remove the private AS numbers. This situation is considered a configuration error.</li> <li>• If the AS path contains the AS number of the eBGP neighbor, BGP does not remove the private AS number.</li> <li>• If the AS path contains confederations, BGP removes the private AS numbers only if they come after the confederation portion of the AS path.</li> </ul> |                       |

## neighbor route-map

```
neighbor {<ip-address> | <peer-group-name>} route-map <route-map-name>
[in | out]
no neighbor {<ip-address> | <peer-group-name>} route-map <route-map-name>
[in | out]
```

Configures a route map to inbound BGP routes.  
The no form of the command undoes the configuration.

|                           |                                                                                                                                                                                                                                                                                                         |                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                              | IP address of the neighbor            |
|                           | peer-group-name                                                                                                                                                                                                                                                                                         | Peer group name                       |
|                           | route-map-name                                                                                                                                                                                                                                                                                          | String. The name of the route-map     |
|                           | in                                                                                                                                                                                                                                                                                                      | Applies route map to inbound routes   |
|                           | out                                                                                                                                                                                                                                                                                                     | Applies route map to out-bound routes |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                     |                                       |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                       |                                       |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                | First version                         |
|                           | 3.3.5200                                                                                                                                                                                                                                                                                                | Updated notes and default             |
|                           | 3.4.1100                                                                                                                                                                                                                                                                                                | Added “out” parameter                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                   |                                       |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 route-map MyRoute-Map in                                                                                                                                                                                                                           |                                       |
| <b>Related Commands</b>   | neighbor <ip-address> remote-as <as-number><br>route-map <map-name> [deny   permit] [sequence-number]<br>clear ip bgp {<ip-address>   all}                                                                                                                                                              |                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Only one inbound route-map can be applied to a given neighbor.</li> <li>If a new route-map is applied to a neighbor, it replaces the previous route map.</li> <li>Changing a route-map only takes effect on routes received or sent after the change.</li> </ul> |                                       |



## neighbor route-reflector-client

**neighbor {<ip-address> | <peer-group-name>} route-reflector-client**  
**no neighbor {<ip-address> | <peer-group-name>} route-reflector-client**

Sets the neighbor as a client but does not set up the reflection itself.  
 The no form of the command disables route reflection for the specific peer.

|                           |                                                                             |                             |
|---------------------------|-----------------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                                  | IP address of the neighbor. |
|                           | peer-group-name                                                             | Peer group name             |
| <b>Default</b>            | N/A                                                                         |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                           |                             |
| <b>History</b>            | 3.3.5006                                                                    | First version               |
|                           | 3.3.5200                                                                    | Updated notes and default   |
| <b>Role</b>               | admin                                                                       |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 route-reflector-client |                             |
| <b>Related Commands</b>   |                                                                             |                             |
| <b>Note</b>               |                                                                             |                             |

## neighbor send-community

**neighbor {<ip-address> | <peer-group-name>} send-community**  
**no neighbor {<ip-address> | <peer-group-name>} send-community**

Configures the switch to send community attributes to the specified BGP neighbor. The no form of the command disables sending community attributes for the specified peer.

|                           |                                                                     |                             |
|---------------------------|---------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                          | IP address of the neighbor. |
|                           | peer-group-name                                                     | Peer group name             |
| <b>Default</b>            | Enabled                                                             |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                   |                             |
| <b>History</b>            | 3.4.0000                                                            | First version               |
| <b>Role</b>               | admin                                                               |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 send-community |                             |
| <b>Related Commands</b>   | N/A                                                                 |                             |
| <b>Note</b>               |                                                                     |                             |

## neighbor shutdown

**neighbor {<ip-address> | <peer-group-name>} shutdown**  
**no neighbor {<ip-address> | <peer-group-name>} shutdown**

Disables BGP neighbor gracefully.  
 The no form of the command enables BGP neighbor.

|                           |                                                                                                     |                             |
|---------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                                                          | IP address of the neighbor. |
|                           | peer-group-name                                                                                     | Peer group name             |
| <b>Default</b>            | Enabled                                                                                             |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                                   |                             |
| <b>History</b>            | 3.3.5006                                                                                            | First version               |
|                           | 3.3.5200                                                                                            | Updated note                |
| <b>Role</b>               | admin                                                                                               |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 shutdown                                       |                             |
| <b>Related Commands</b>   | N/A                                                                                                 |                             |
| <b>Note</b>               | Disabling a neighbor terminates all its active sessions and removes associated routing information. |                             |

## neighbor soft-reconfiguration inbound

**neighbor {<ip-address> | <peer-group-name>} soft-reconfiguration inbound**  
**no neighbor {<ip-address> | <peer-group-name>} soft-reconfiguration inbound**

Disables BGP neighbor gracefully.

The no form of the command restores the system default behavior (retaining all routes from the specified neighbor or group).

|                           |                                                                                                                                                                                                                                                                                                                                                                                 |                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                      | IP address of the neighbor. |
|                           | peer-group-name                                                                                                                                                                                                                                                                                                                                                                 | Peer group name             |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                             |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                               |                             |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                        | First version               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                           |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 soft-reconfiguration inbound                                                                                                                                                                                                                                                                                               |                             |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                             |                             |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This command also allows the switch to display all advertised routes when the command <code>show ip bgp neighbor advertised-routes</code> is issued.</li> <li>The no form of the command configures the switch to discard information about routes received from the specified neighbor or group that fail the import policy.</li> </ul> |                             |

## neighbor timers

**neighbor {<ip-address> | <peer-group-name>} timers <keep-alive> <hold-time>**  
**no neighbor {<ip-address> | <peer-group-name>} timers**

Configures the keepalive and hold times for a specified peer.  
 The no form of the command resets the parameters to their default values.

|                           |                                                                                                    |                                                                                                                                                                                           |
|---------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                         | IP address of the neighbor.                                                                                                                                                               |
|                           | peer-group-name                                                                                    | Peer group name                                                                                                                                                                           |
|                           | keep-alive                                                                                         | The period between the transmission of consecutive keep-alive messages. Range: 1-3600 seconds. "0" means that keepalive is not sent and the connection does not expire.                   |
|                           | hold-time                                                                                          | The period the switch waits for a keepalive or update message before it disables peering. Range: 3-7200 seconds. "0" means that keepalive is not sent and the connection does not expire. |
| <b>Default</b>            | keep-alive: 60 seconds<br>hold-time: 180 seconds                                                   |                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config Router BGP                                                                                  |                                                                                                                                                                                           |
| <b>History</b>            | 3.3.5006                                                                                           | First version                                                                                                                                                                             |
|                           | 3.3.5200                                                                                           | Updated description                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                              |                                                                                                                                                                                           |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 timers 65 195                                 |                                                                                                                                                                                           |
| <b>Related Commands</b>   | neighbor <ip-address> remote-as <as-number>                                                        |                                                                                                                                                                                           |
| <b>Note</b>               | Hold time must be at least 3 seconds and should be three times longer than the keep-alive setting. |                                                                                                                                                                                           |

## neighbor transport connection-mode passive

**neighbor {<ip-address> | <peer-group-name>} transport connection-mode passive**

**no neighbor {<ip-address> | <peer-group-name>} transport connection-mode passive**

Sets the TCP connection for the specified BGP neighbor or peer group to passive mode.

The no form of the command sets the specified BGP neighbor or peer group to active connection mode.

|                           |                                                                                                                                                                                                                                                                     |                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                          | IP address of the neighbor. |
|                           | peer-group-name                                                                                                                                                                                                                                                     | Peer group name             |
| <b>Default</b>            | TCP sessions initiated                                                                                                                                                                                                                                              |                             |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                   |                             |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                            | First version               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                               |                             |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 transport connection-mode passive                                                                                                                                                                              |                             |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                     |                             |
| <b>Note</b>               | <ul style="list-style-type: none"><li>When the peer’s transport connection mode is set to passive, it accepts TCP connections for BGP, but does not initiate them.</li><li>BGP peers in active mode can both accept and initiate TCP connections for BGP.</li></ul> |                             |

## neighbor update-source

**neighbor <ip-address> update-source {ethernet <slot/port> | loopback <number> | port-channel <number> | vlan <vlan-id>}**  
**no neighbor <ip-address> update-source**

Configures the source-address for routing updates and to establish TCP connections with peers.

The no form of the command disables configured source-address for routing updates and for TCP connection establishment with a peer.

|                           |                                                                           |                                 |
|---------------------------|---------------------------------------------------------------------------|---------------------------------|
| <b>Syntax Description</b> | ip-address                                                                | IP address of the neighbor.     |
|                           | ethernet <slot/port>                                                      | Ethernet interface.             |
|                           | loopback <number>                                                         | Loopback interface number.      |
|                           | vlan <vlan-id>                                                            | VLAN interface. Range: 1-4094.  |
|                           | port-channel <number>                                                     | LAG interface. Range is 1-4094. |
| <b>Default</b>            | BGP uses best local address                                               |                                 |
| <b>Configuration Mode</b> | Config Router BGP                                                         |                                 |
| <b>History</b>            | 3.3.5006                                                                  | First version                   |
|                           | 3.3.5200                                                                  | Updated example                 |
| <b>Role</b>               | admin                                                                     |                                 |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.2 update-source vlan 10 |                                 |
| <b>Related Commands</b>   | N/A                                                                       |                                 |
| <b>Note</b>               |                                                                           |                                 |

## neighbor weight

**neighbor {<ip-address> | <peer-group-name>} weight <value>**

**no neighbor {<ip-address> | <peer-group-name>} weight**

Assigns a weight attribute to paths from the specified neighbor.  
The no form of the command resets to default values.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | IP address of the neighbor    |
|                           | peer-group-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Peer group name               |
|                           | value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Weight value. Range: 1-65535. |
| <b>Default</b>            | Value is 32768 for router-originated paths and 0 for routes received through BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | First version                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                               |
| <b>Example</b>            | switch (config router bgp 100)# neighbor 10.10.10.10 weight 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Weight values set through route map commands have precedence over neighbor weight command values.</li> <li>Other attributes are used only when all paths to the prefix have the same weight.</li> <li>A path's BGP weight is also configurable through route maps.</li> <li>When multiple paths to a destination prefix exist, the best-path selection algorithm prefers the path with the highest weight.</li> <li>Weight is the first parameter that the BGP best-path selection algorithm considers.</li> </ul> |                               |



## network

**network** <ip-prefix> <length> [<route-map-name>]

**no network** <ip-prefix> <length> [<route-map-name>]

Configures a route for advertisement to BGP peers.

The no form of the command removes the route from the BGP routes table, preventing its advertisement. The route is only advertised if the router has a gateway to the destination.

|                           |                                                                                                                                                                                                                                                                   |                                                                                            |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-prefix                                                                                                                                                                                                                                                         | A string that specific route map is assigned to the network.                               |
|                           | length                                                                                                                                                                                                                                                            | /24 or 255.255.255.0 format.                                                               |
|                           | route-map-name                                                                                                                                                                                                                                                    | The name of a route-map which is used to set the route's attributes when it is advertised. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                               |                                                                                            |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                 |                                                                                            |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                          | First version                                                                              |
|                           | 3.3.5200                                                                                                                                                                                                                                                          | Updated description, syntax description and notes                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                             |                                                                                            |
| <b>Example</b>            | switch (config router bgp 100)# network 10.10.10.0 /24 routemap                                                                                                                                                                                                   |                                                                                            |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                   |                                                                                            |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The parameters "ip-prefix" and "length" specify the route destination.</li> <li>The configuration zeros the host portion of the specified network address. For example, 192.0.2.4/24 is stored as 192.0.2.0/24.</li> </ul> |                                                                                            |

## redistribute

**redistribute {connected | static | ospf | ospf-internal | ospf-external} [<route-map>]**

**no redistribute {connected | static | ospf}**

Enables redistribution of specified routes to the BGP domain.  
The no form of the command disables route redistribution from the specified source.

|                           |                                                   |                                                                    |
|---------------------------|---------------------------------------------------|--------------------------------------------------------------------|
| <b>Syntax Description</b> | connected                                         | Redistributes the direct routes                                    |
|                           | static                                            | Redistributes the user-defined (static) route                      |
|                           | ospf                                              | Redistributes all routes learned by ospf protocol                  |
|                           | ospf-internal                                     | Redistributes all ospf-learned routes which are marked as internal |
|                           | ospf-external                                     | Redistributes all ospf-learned routes which are marked as external |
| <b>Default</b>            | No redistribution                                 |                                                                    |
| <b>Configuration Mode</b> | Config Router BGP                                 |                                                                    |
| <b>History</b>            | 3.2.1000                                          |                                                                    |
| <b>Role</b>               | admin                                             |                                                                    |
| <b>Example</b>            | switch (config router bgp 100)# redistribute ospf |                                                                    |
| <b>Related Commands</b>   | N/A                                               |                                                                    |
| <b>Note</b>               | Multiple redistribution options can be applied.   |                                                                    |

## router-id

**router-id <ip-address>**

**no router-id**

Configures a fixed router ID for BGP.

The no form of the command removes the fixed router ID and restores the system default.

| Syntax Description        | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | IP Address identified the router ID |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Default</b>            | <p>The Router ID is dynamically elected (no router-id).</p> <ul style="list-style-type: none"> <li>• If a loopback interface is configured, the router ID is set to the IP address of the loopback interface.</li> <li>• If multiple loopback interfaces are configured, the router ID is set to the IP address of the loopback interface with the highest IP address.</li> <li>• If no loopback interface is configured, the router ID is set to the highest IP address on a physical interface.</li> </ul> |                                     |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                     |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     |
| <b>Example</b>            | switch (config router bgp 100)# router-id 10.10.10.10                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |
| <b>Note</b>               | The IP address configured identifies the BGP speaker. The command triggers an automatic notification and session reset for the BGP neighbors.                                                                                                                                                                                                                                                                                                                                                                |                                     |

## timers bgp

**timers bgp <keep-alive> <hold>**  
**no timers bgp**

Configures the BGP keepalive and hold times.  
 The no form of the command resets the parameters to their default settings.

|                           |                                                                                                                                                                                                                                                                                |                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | keep-alive                                                                                                                                                                                                                                                                     | Frequency (in seconds) with which keepalive messages are sent to its peer. Range: 1-3600 seconds; 0 – no keep-alive messages are sent.                                       |
|                           | hold                                                                                                                                                                                                                                                                           | Interval (in seconds) after not receiving a keepalive message that a peer is declared dead. 3-7200 seconds; 0 – peer is held indefinitely regardless of keep-alive messages. |
| <b>Default</b>            | Keepalive time: 60 secs<br>Hold time: 180 secs                                                                                                                                                                                                                                 |                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config Router BGP                                                                                                                                                                                                                                                              |                                                                                                                                                                              |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                       | First version                                                                                                                                                                |
|                           | 3.3.5200                                                                                                                                                                                                                                                                       | Updated syntax description, related commands and notes                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                          |                                                                                                                                                                              |
| <b>Example</b>            | switch (config router bgp 100)# timers bgp 61 181<br>switch (config router bgp 100)#                                                                                                                                                                                           |                                                                                                                                                                              |
| <b>Related Commands</b>   | ip routing<br>neighbor timers<br>router bgp <as-number><br>show ip bgp                                                                                                                                                                                                         |                                                                                                                                                                              |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Timer settings apply to every peer connection.</li> <li>• The command “neighbor timers” configures the times on a specified peer connection.</li> <li>• Hold time should be three times longer than the keepalive setting.</li> </ul> |                                                                                                                                                                              |

### 6.4.4.3 Show

## show ip bgp

**show ip bgp [<ip-address> <mask> [detail | longer-prefixes [detail]]]**

Displays information about the BGP routes table (RIB).

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | IP address (e.g. 172.3.12.4).                                                                                                                                                                                                                                                                                                                             |
|                           | mask                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Netmask (e.g. /24 or 255.255.255.0).                                                                                                                                                                                                                                                                                                                      |
|                           | detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Displays detailed information about a subset of the bgp learned routes.                                                                                                                                                                                                                                                                                   |
|                           | longer-prefixes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Displays the routes to the specified destination and any routes to a more specific destination.<br>Example: If “10.20.30.0 /24 longer-prefixes” is run, all routes starting with 10.20.30 regardless of the prefix length (10.20.30.X /24, 10.20.30.X /25, etc.) are displayed – providing there are any such routes received/sent from/to that neighbor. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # show ip bgp BGP table version is 100, local router ID is 16.0.1.1 Status codes: s suppressed, d damped, h history, * valid, &gt; best, i - internal                r RIB-failure, S Stale, m multipath, b backup-path, x best-external Origin codes: i - IGP, e - EGP, ? - incomplete                 100.100.100.0/24 2.2.2.2 0 2 50 100 e                 100.100.100.0/24 2.2.2.12 0 12 50 100 e Network          Next Hop        Metric LocPrf Weight Path 20.20.20.0/24    2.2.2.2          0      2      20      e 40.40.40.0/24    4.4.4.4          0      4      40      i 100.100.90.32/28 2.2.2.2          0      2     100      i 100.100.100.0/24 4.4.4.4          0      4      50      i  switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                           |

## show ip bgp community

**show ip bgp community <comm<sub>1</sub>> <comm<sub>2</sub>> ... <comm<sub>n</sub>> [exact] [detail]**

Displays information about the BGP routes (RIB) filtered according to communities.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Example</b>            | <pre>switch (config) # show ip bgp community 100:1 BGP table version is 8, local router ID is 3.5.7.4 Status codes: s suppressed, d damped, h history, * valid, &gt; best, i - internal                 r RIB-failure, S Stale, m multipath, b backup-path, x best- external Origin codes: i - IGP, e - EGP, ? - incomplete        Network          Next Hop           Metric      LocPrf      Weight Path *&gt;  3.4.3.11/32        0.0.0.0              0           0          32768 i *&gt;  3.5.7.88/32        0.0.0.0              0           0          32768 i *&gt;  3.5.7.99/32        0.0.0.0              0           0          32768 i  switch (config) # show ip bgp community 100:1 exact BGP table version is 8, local router ID is 3.5.7.4 Status codes: s suppressed, d damped, h history, * valid, &gt; best, i - internal                 r RIB-failure, S Stale, m multipath, b backup-path, x best- external Origin codes: i - IGP, e - EGP, ? - incomplete        Network          Next Hop           Metric      LocPrf      Weight Path *&gt;  3.4.3.11/32        0.0.0.0              0           0          32768 i *&gt;  3.5.7.99/32        0.0.0.0              0           0          32768 i</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## show ip bgp neighbors

### show ip bgp neighbors

Displays summaries information about all BGP neighbors.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Example</b>            | <pre>switch (config) # show ip bgp neighbors &lt;ip&gt; received switch-e07c04 [standalone: master] (config) # show ip bgp neighbors 3.5.7.5 received BGP table version is 66, local router ID is 3.5.7.4 Status codes: s suppressed, d damped, h history, * valid, &gt; best, i - internal                 r RIB-failure, S Stale, m multipath, b backup-path, x best- external Origin codes: i - IGP, e - EGP, ? - incomplete        Network          Next Hop          Metric      LocPrf      Weight Path *&gt; 100.0.20.0/24      3.5.7.5              10          100          0 5 i *&gt; 3.5.7.128/32      3.5.7.5              7           100          0 5 i *&gt; 100.0.30.0/24      3.5.7.5              0           100          0 5 i *&gt; 10.20.30.0/24      3.5.7.5              0           100          0 5 12 i switch-e07c04 [standalone: master] (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## show ip bgp neighbors <ip>

**show ip bgp neighbors <ip-address>**

Displays BGP summary information.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Neighbor IP address.                                                                                                                                                                                                                                                                                                                                      |
|                           | advertised                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Displays routes advertised to the specified neighbor.                                                                                                                                                                                                                                                                                                     |
|                           | received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Displays routes received and accepted from specified neighbor.                                                                                                                                                                                                                                                                                            |
|                           | both                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Displays routes received from specified neighbor.                                                                                                                                                                                                                                                                                                         |
|                           | longer-prefixes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays the routes to the specified destination and any routes to a more specific destination.<br>Example: If “10.20.30.0 /24 longer-prefixes” is run, all routes starting with 10.20.30 regardless of the prefix length (10.20.30.X /24, 10.20.30.X /25, etc.) are displayed – providing there are any such routes received/sent from/to that neighbor. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre> switch-e07c04 [standalone: master] (config) # show ip bgp neighbors 3.5.7.5 received BGP table version is 66, local router ID is 3.5.7.4 Status codes: s suppressed, d damped, h history, * valid, &gt; best, i - internal                 r RIB-failure, S Stale, m multipath, b backup-path, x best- external Origin codes: i - IGP, e - EGP, ? - incomplete        Network          Next Hop           Metric      LocPrf      Weight Path *&gt; 100.0.20.0/24      3.5.7.5              10           100         0 5 i *&gt; 3.5.7.128/32       3.5.7.5               7           100         0 5 i *&gt; 100.0.30.0/24      3.5.7.5               0           100         0 5 i *&gt; 10.20.30.0/24      3.5.7.5               0           100          0 5 12 i switch-e07c04 [standalone: master] (config) # </pre> |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                           |



## show ip bgp neighbors <ip> received

**show ip bgp neighbors <ip-address> received [<ip-address> [<mask>] [longer-prefixes]**

Displays BGP summary information.

|                           |                  |                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-address       | Neighbor IP address.                                                                                                                                                                                                                                                                                                                                      |
|                           | received         | Displays routes received and accepted from specified neighbor.                                                                                                                                                                                                                                                                                            |
|                           | longer-prefixes  | Displays the routes to the specified destination and any routes to a more specific destination.<br>Example: If “10.20.30.0 /24 longer-prefixes” is run, all routes starting with 10.20.30 regardless of the prefix length (10.20.30.X /24, 10.20.30.X /25, etc.) are displayed – providing there are any such routes received/sent from/to that neighbor. |
| <b>Default</b>            | N/A              |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode |                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.5200         |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin            |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            |                  |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | N/A              |                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                  |                                                                                                                                                                                                                                                                                                                                                           |

## show ip bgp paths

### show ip bgp paths

Displays summary of all AS paths.

|                           |                                                                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                               |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                  |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # show ip bgp paths Refcount  Metric  Path 1          0       4 50 100 1          0       2 50 100 1          0       4 40 1          0      12 50 100 1          0        2 1          0       2 20 switch (config) #</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                                                   |

## show ip bgp peer-group

**show ip bgp peer-group [<peer-group-name>]**

Displays information about peer groups.

| Syntax Description | peer-group-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Displays information about a specific peer-group. |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |
| History            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |
| Example            | <pre> switch (config) # show ip bgp peer-group BGP Peer-group [grpA]: Hold time: 1, Keep-alive: 60 Allow as-in: 0 Weight: 32768 Max prefix: 12000 Export local preferences: 100, Import local preferences: 100 Soft reconfiguration: set Neighbor          V      AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down State/PfxRcd 3.5.7.5            0        5      0      0      0   0   0 0:00:00:42 CONNECT 100.100.100.100    0       100      0      0      0   0   0 Never IDLE  BGP Peer-group [grpB]: Hold time: 1, Keep-alive: 60 Allow as-in: 0 Weight: 32768 Max prefix: 12000 Export local preferences: 100, Import local preferences: 100 Soft reconfiguration: set Neighbor          V      AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down State/PfxRcd 3.4.3.7            0        7      0      0      0   0   0 0:00:00:17 ACTIVE  BGP Peer-group [tomar_group]: Hold time: 1, Keep-alive: 60 Allow as-in: 0 Weight: 32768 Max prefix: 12000 Export local preferences: 100, Import local preferences: 100 Soft reconfiguration: set  Peer-groups count: 3 switch-e07c04 [standalone: master] (config) # </pre> |                                                   |
| Related Commands   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |

## show ip bgp summary

### show ip bgp summary

Displays BGP summary information.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre> switch (config) # show ip bgp summary BGP router identifier 3.5.7.4, local AS number 4 BGP table version is 70, main routing table version 70 8 network entries using 2176 bytes of memory 4 path entries using 1088 bytes of memory 4 BGP path attribute entries using 256 bytes of memory 0 multipath network entries and 0 multipath paths 4 BGP community entries using 64 bytes of memory 0 received paths for inbound soft reconfiguration BGP using 26308 total bytes of memory Dampening disabled. 0 history paths, 0 dampened paths BGP activity 37/8 prefixes, 37/4 paths Neighbor          V    AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down State/PfxRcd 3.4.3.7            4      7      3      9      70    0    0 0:00:00:48 ESTABLISHED 3.5.7.5            0      5      0      0      0     0    0 0:00:01:54 CONNECT 100.100.100.100    0     100      0      0      0     0    0 Never IDLE </pre> <p>switch-e07c04 [standalone: master] (config) #</p> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## 6.4.5 IP AS-Path Access-List

### 6.4.5.1 Commands

#### ip as-path access-list

**ip as-path access-list <list-name> {permit | deny} <reg-exp> [any | egp | igp | incomplete]**  
**no ip as-path access-list <list-name>**

Creates an access list to filter BGP route updates.  
 The no ip as-path access-list command deletes the named access list.

|                           |                                                                                                                                 |                                                                                        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list-name                                                                                                                       | The name for the access list                                                           |
|                           | permit                                                                                                                          | Permits access for a matching condition                                                |
|                           | deny                                                                                                                            | Denies access for a matching condition                                                 |
|                           | reg-exp                                                                                                                         | Regular expression that is used to specify a pattern to match against an input string. |
|                           | any                                                                                                                             | Any route type                                                                         |
|                           | egp                                                                                                                             | External BGP routes                                                                    |
|                           | igp                                                                                                                             | Internal BGP routes                                                                    |
|                           | incomplete                                                                                                                      | Routes marked as “Incomplete”                                                          |
| <b>Default</b>            | N/A                                                                                                                             |                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                          |                                                                                        |
| <b>History</b>            | 3.4.0000                                                                                                                        |                                                                                        |
| <b>Role</b>               | admin                                                                                                                           |                                                                                        |
| <b>Example</b>            | <pre>switch (config)# ip as-path access-list mylist permit switch (config)#</pre>                                               |                                                                                        |
| <b>Related Commands</b>   | N/A                                                                                                                             |                                                                                        |
| <b>Note</b>               | If access list_name does not exist, this command creates it. If it already exists, this command appends statements to the list. |                                                                                        |

## show ip as-path access-list

**show ip as-path access-list [list-name]**

Presents defined as-path access lists

|                           |                                                     |                                  |
|---------------------------|-----------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | list-name                                           | Displays a specific prefix-list. |
| <b>Default</b>            | N/A                                                 |                                  |
| <b>Configuration Mode</b> | Config                                              |                                  |
| <b>History</b>            | 3.4.0000                                            |                                  |
| <b>Role</b>               | admin                                               |                                  |
| <b>Example</b>            | switch (config)# show ip as-path access-list mylist |                                  |
| <b>Related Commands</b>   | N/A                                                 |                                  |
| <b>Note</b>               |                                                     |                                  |

## 6.4.6 IP Community-List

### 6.4.6.1 Commands

#### ip community-list standard

**ip community-list standard <list-name> {deny | permit} <list-of-communities>**  
**no ip community-list standard <list-name>**

Adds a standard entry to a community-list.  
 The no form of the command deletes the specified community list.

|                           |                                                                                                                                                                            |                                                                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list-name                                                                                                                                                                  | The name for the community list                                                                                                                                                                                |
|                           | permit                                                                                                                                                                     | Permits access for a matching condition.                                                                                                                                                                       |
|                           | deny                                                                                                                                                                       | Denies access for a matching condition.                                                                                                                                                                        |
|                           | list-of-communities                                                                                                                                                        | List of standard communities: <ul style="list-style-type: none"> <li>• &lt;aa:nn&gt;</li> <li>• &lt;number&gt;</li> <li>• internet</li> <li>• local-AS</li> <li>• no-advertise</li> <li>• no-export</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                        |                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                     |                                                                                                                                                                                                                |
| <b>History</b>            | 3.4.0000                                                                                                                                                                   |                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                      |                                                                                                                                                                                                                |
| <b>Example</b>            | switch (config)# ip community-list standard mycommunity permit 1:2 3:4                                                                                                     |                                                                                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                                                                                                                                        |                                                                                                                                                                                                                |
| <b>Note</b>               | A BGP community access list filters route maps that are configured as BGP communities. The command uses regular expressions to name the communities specified by the list. |                                                                                                                                                                                                                |

## ip community-list expanded

**ip community-list expanded** <list-name> {deny | permit} <reg-exp>  
**no ip community-list expanded** <list-name>

Adds a regular expression entry to a community-list  
 The no form of the command deletes the specified community list.

|                           |                                                                                                                                                                            |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list-name                                                                                                                                                                  | Configures a named standard community list.                                            |
|                           | permit                                                                                                                                                                     | Permits access for a matching condition.                                               |
|                           | deny                                                                                                                                                                       | Denies access for a matching condition.                                                |
|                           | reg-exp                                                                                                                                                                    | Regular expression that is used to specify a pattern to match against an input string. |
| <b>Default</b>            | N/A                                                                                                                                                                        |                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                                                                     |                                                                                        |
| <b>History</b>            | 3.4.0000                                                                                                                                                                   |                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                      |                                                                                        |
| <b>Example</b>            | switch (config)# ip community-list expanded mycommunity permit<br>1:[0-9]+                                                                                                 |                                                                                        |
| <b>Related Commands</b>   | N/A                                                                                                                                                                        |                                                                                        |
| <b>Note</b>               | A BGP community access list filters route maps that are configured as BGP communities. The command uses regular expressions to name the communities specified by the list. |                                                                                        |



## show ip community-list

**show ip community-list [community-list-name]**

Displays the defined community lists

|                           |                                                                                                                                                                            |                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | community-list-name                                                                                                                                                        | An optional parameter to display only the specified list |
| <b>Default</b>            | N/A                                                                                                                                                                        |                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                     |                                                          |
| <b>History</b>            | 3.4.0000                                                                                                                                                                   |                                                          |
| <b>Role</b>               | admin                                                                                                                                                                      |                                                          |
| <b>Example</b>            | switch (config)# show ip community-list mycommunity                                                                                                                        |                                                          |
| <b>Related Commands</b>   | N/A                                                                                                                                                                        |                                                          |
| <b>Note</b>               | A BGP community access list filters route maps that are configured as BGP communities. The command uses regular expressions to name the communities specified by the list. |                                                          |

## 6.5 Policy Rules

### 6.5.1 Route Map

Route maps define conditions for redistributing routes between routing protocols. A route map clause is identified by a name, filter type (permit or deny) and a sequence number. Clauses with the same name are components of a single route map; the sequence number determines the order in which the clauses are compared to a route.

### 6.5.1.1 Commands

## route-map

**route-map <map-name> [deny | permit] [sequence-number]**  
**no route-map <map-tag> {deny | permit} [<sequence-number>]**

Creates a route map that can be used for importing, exporting routes and applying local policies.

|                           |                                                                                                                                                                                                                                                                                                      |                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Syntax Description</b> | name                                                                                                                                                                                                                                                                                                 | Name of the route-map.                           |
|                           | deny   permit                                                                                                                                                                                                                                                                                        | Configures the rule to be used.                  |
|                           | sequence-number                                                                                                                                                                                                                                                                                      | Sequence number for a route-map specific record. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                  |                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                               |                                                  |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                             |                                                  |
|                           | 3.3.5200                                                                                                                                                                                                                                                                                             | Updated notes                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                |                                                  |
| <b>Example</b>            | <pre>switch (config) # route-map mymap permit 1200 switch (config route-map mymap permit 1200)#</pre>                                                                                                                                                                                                |                                                  |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                  |                                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• All changes in a the route map configuration mode become pending until the end of the route-map session.</li> <li>• If not configured, deny   permit is configured as permit.</li> <li>• If not configured, sequence-number default value is 10.</li> </ul> |                                                  |

## continue <sequence-number>

**continue <sequence-number>**

**no continue**

Enables additional route map evaluation of routes whose parameters meet the clause's matching criteria.

The no form of the command removes this configuration from the route map clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | prefix-list-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>History</b>            | 3.3.5006 First version<br>3.3.5200 Updated example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Example</b>            | <pre> switch (config route-map mymap permit 10)# match as-number 40 switch (config route-map mymap permit 10)# set weight 7 switch (config route-map mymap permit 10)# continue 1200 switch (config route-map mymap permit 10)# exit switch (config)# show route-map test route-map test, permit, sequence 10   Match clauses:     as-number 40   Set clauses:     weight 7     continue 1200 switch (config route-map mymap permit 10)# route-map test permit 10 no continue switch (config route-map mymap permit 10)# show route-map test route-map test, permit, sequence 10   Match clauses:     as-number 40   Set clauses:     weight 7 switch (config route-map mymap permit 10)# </pre>                                                                                                                                                                                                                                                                                                                   |
| <b>Related Commands</b>   | route-map <map-name> [deny   permit] [sequence-number]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>A clause typically contains a match (route-map) and a set (route-map) statement. The evaluation of routes whose settings are the same as match statement parameters normally end and the clause's set statement are applied to the route. Routes that match a clause containing a continue statement are evaluated against the clause specified by the continue statement.</li> <li>When a route matches multiple route-map clauses, the filter action (deny or permit) is determined by the last clause that the route matches. The set statements in all clauses matching the route are applied to the route after the route map evaluation is complete. Multiple set statements are applied in the same order by which the route was evaluated against the clauses containing them.</li> <li>Continue cannot be set to go back to a previous clause; &lt;sequence-number&gt; of the continue must always be higher than the current clause's sequence number.</li> </ul> |

## abort

### abort

Discards pending changes and returns to global configuration mode.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.3.5006 First version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                           | 3.3.5200 Updated example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre> switch (config)# route-map mymap permit 10 match as-number 40 switch (config)# route-map mymap permit 10 set weight 7 switch (config)# show route-map test route-map test, permit, sequence 10   Match clauses:     as-number 40   Set clauses:     weight 7 switch (config)# route-map mymap permit 1200 switch (config route-map mymap permit 1200)# set weight 11 switch (config route-map mymap permit 1200)# abort switch (config)# show route-map mymap route-map mymap, permit, sequence 10   Match clauses:     as-number 40   Set clauses:     weight 7 switch (config)# </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## exit

### exit

Saves pending route map clause changes to running-config and returns to global configuration mode.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Example</b>            | <pre> switch (config)# route-map mymap permit 10 match as-number 40 switch (config)# route-map mymap permit 10 set weight 7 switch (config)# show route-map test route-map test, permit, sequence 10   Match clauses:     as-number 40   Set clauses:     weight 7 switch (config)# route-map mymap permit 1200 switch (config route-map mymap permit 1200)# set weight 11 switch (config route-map mymap permit 1200)# exit switch (config)# show route-map test route-map mymap, permit, sequence 10   Match clauses:     as-number 40   Set clauses:     weight 7 route-map mymap, permit, sequence 1200   Set clauses:     weight 11 switch (config)# </pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## match as-number

**match as-number <number>**

**no match as-number**

Filters according to one of the AS numbers in the AS path of the route.  
The no form of the command removes this configuration from the route map clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Syntax Description</b> | number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Autonomous system number to check. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                    |
| <b>Example</b>            | <pre>switch (config route-map mymap permit 10)# match as-number 40 switch (config route-map mymap permit 10)#</pre>                                                                                                                                                                                                                                                                                                                                                                              |                                    |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                                    |

## match as-path

**match as-path** <as-path-list name>

**no match as-path**

Creates a route map clause entry that matches the route's AS path using an as-path access-list.

The no form of the command removes the match statement from the configuration mode route map clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Syntax Description</b> | number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Autonomous system number to check. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                    |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match as-path my-list                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                                    |



## match community

**match community** <list-of-communities> [exact-match]

**no match community** <list-of-communities>

Creates a route map clause entry that matches a route if it contains at least the specified communities.

The no form of the command removes the match clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list of communities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | List of standard communities: <ul style="list-style-type: none"> <li>• &lt;aa:nn&gt;</li> <li>• &lt;number&gt;</li> <li>• internet</li> <li>• local-AS</li> <li>• no-advertise</li> <li>• no-export</li> </ul> |
|                           | exact-match                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Creates a route map clause entry that matches the route's communities exactly.                                                                                                                                 |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match community 1:100 3:52                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>• When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>• If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                                                                                                                                                                                                                |

## match community-list

**match community <communities-list-name> exact-match**  
**no match community <communities-list-name> exact-match**

Creates a route map clause entry that specifies one route filtering condition  
 The no form of the command removes the match clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | communities-list-name      A name of an IP community list                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match community-list<br>COM_LIST exact-match                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>• When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>• If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |

## match interface

**match interface** <interface-type> <number>  
**no match interface**

Matches the route's interface  
 The no form of the command removes the match clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Syntax Description</b> | prefix-list-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Prefix-list name. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match interface ethernet 1/1                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                   |

## match ip address

**match ip address <prefix-list-name>**

**no match ip address**

Filters according to IPv4 prefix list.

The no form of the command removes this configuration from the route map clause.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Syntax Description</b> | prefix-list-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Prefix-list name. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match ip address listSmallRoutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> <li>The prefix-list-name should point to an existing IP prefix-list. If it is not found, no route is considered as a match for this clause.</li> </ul> |                   |

## match ip next-hop

**match ip next-hop <value>**

**no match ip next-hop**

Configures a route's entry next-hop match.

The no form of the command removes a route-map's entry next-hop match.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                 |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Syntax Description</b> | value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Next hop IP address: A.B.C.D (e.g, 10.0.13.86). |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                 |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                 |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                 |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match ip next-hop 10.10.10.10                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                                                 |

## match local-preference

**match local-preference <value>**

**no match local-preference**

Configures a route's entry local-preference match.

The no form of the command removes a route-map's entry local-preference match.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Syntax Description</b> | value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Range: 1-2147483647. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | First version        |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Updated value range  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match local-preference 10                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                      |

## match metric

**match metric <value>**

**no match metric**

Configures a route's entry metric match.

The no form of the command removes a route-map's entry metric match.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Syntax Description</b> | value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Range: 1-2147483647. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | First version        |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Updated value range  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |
| <b>Example</b>            | switch (config route-map mymap permit 10)# match metric 10                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>When a clause contains multiple match commands, the permit or deny filter applies to a route only if its properties are equal to corresponding parameters in each match statement.</li> <li>When a route's properties do not equal the statement parameters, the route is evaluated against the next clause in the route map, as determined by sequence number.</li> <li>If all clauses fail to permit or deny the route, the route is denied.</li> </ul> |                      |

## set as-path prepend

**set as-path prepend** <value<sub>1</sub>> <value<sub>2</sub>> ... <value<sub>n</sub>>

**no set as-path prepend**

Modifies as-path on affected routes

The no form of the command removes the set statement from the route map.

|                           |                                                                     |                                                                     |
|---------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | value                                                               | BGP AS number that is prepended to as-path.<br>Range: 1-4294967295. |
| <b>Default</b>            | N/A                                                                 |                                                                     |
| <b>Configuration Mode</b> | Config Route Map                                                    |                                                                     |
| <b>History</b>            | 3.4.0000                                                            |                                                                     |
| <b>Role</b>               | admin                                                               |                                                                     |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set as-path prepend 5 10 |                                                                     |
| <b>Related Commands</b>   | N/A                                                                 |                                                                     |
| <b>Note</b>               |                                                                     |                                                                     |



## set as-path tag

**set as-path tag <value>**

**no set as-path tag**

Configures a route's entry AS-path tag parameter.

The no form of the command removes a route-map's entry AS path tag setting.

|                           |                                                              |                      |
|---------------------------|--------------------------------------------------------------|----------------------|
| <b>Syntax Description</b> | value                                                        | Range: 1-2147483648. |
| <b>Default</b>            | N/A                                                          |                      |
| <b>Configuration Mode</b> | Config Route Map                                             |                      |
| <b>History</b>            | 3.3.5200                                                     |                      |
| <b>Role</b>               | admin                                                        |                      |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set as-path tag 1 |                      |
| <b>Related Commands</b>   | N/A                                                          |                      |
| <b>Note</b>               |                                                              |                      |

## set community

**set community** {<list of communities> | none}  
**no set community** {<list of communities> | none}

Sets the community attribute of a distributed route  
 The no form of the command removes the set statement from the clause.

|                           |                                                                  |                                                                                                                                                                                                                |
|---------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list of communities                                              | List of standard communities: <ul style="list-style-type: none"> <li>• &lt;aa:nn&gt;</li> <li>• &lt;number&gt;</li> <li>• internet</li> <li>• local-AS</li> <li>• no-advertise</li> <li>• no-export</li> </ul> |
| <b>Default</b>            | N/A                                                              |                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Route Map                                                 |                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.5200                                                         |                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                            |                                                                                                                                                                                                                |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set community 1:2 3:4 |                                                                                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                              |                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                  |                                                                                                                                                                                                                |

## set community additive

**set community <list-of-communities> additive**  
**no set community <list-of-communities> additive**

Adds the matching communities  
 The no form of the command removes the set statement from the clause.

|                           |                                                               |                                                                                                                                                                                                                |
|---------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list-of-communities                                           | List of standard communities: <ul style="list-style-type: none"> <li>• &lt;aa:nn&gt;</li> <li>• &lt;number&gt;</li> <li>• internet</li> <li>• local-AS</li> <li>• no-advertise</li> <li>• no-export</li> </ul> |
| <b>Default</b>            | N/A                                                           |                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Route Map                                              |                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.5200                                                      |                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                         |                                                                                                                                                                                                                |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set community none |                                                                                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                           |                                                                                                                                                                                                                |
| <b>Note</b>               |                                                               |                                                                                                                                                                                                                |

## set community none

**set community none**  
**no set community none**

Sets the community attribute of a distributed route to be empty  
The no form of the command removes the set statement from the clause.

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Default</b>            | N/A                                                           |
| <b>Configuration Mode</b> | Config Route Map                                              |
| <b>History</b>            | 3.3.5200                                                      |
| <b>Role</b>               | admin                                                         |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set community none |
| <b>Related Commands</b>   | N/A                                                           |

---

### Note

---

## set community delete

**set community <list of communities> delete**  
**no set community <list of communities> delete**

Deletes matching communities.  
 The no form of the command removes the set statement from the clause.

|                           |                                                                                                                                                                                               |                                                                                                                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list of communities                                                                                                                                                                           | List of standard communities: <ul style="list-style-type: none"> <li>• &lt;aa:nn&gt;</li> <li>• &lt;number&gt;</li> <li>• internet</li> <li>• local-AS</li> <li>• no-advertise</li> <li>• no-export</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                                           |                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Route Map                                                                                                                                                                              |                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                      |                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                         |                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch-e07c04 [standalone: master] (config) # route-map test_route_map switch-e07c04 [standalone: master] (config route-map test_route_map permit 10) # set community 400:1 delete</pre> |                                                                                                                                                                                                                |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                           |                                                                                                                                                                                                                |
| <b>Note</b>               |                                                                                                                                                                                               |                                                                                                                                                                                                                |

## set community-list

**set community-list** <community-list-name>

**no set community** <list of communities>

Configures a named standard community list.

The no form of the command removes the set statement from the clause.

|                           |                                                                                   |                        |
|---------------------------|-----------------------------------------------------------------------------------|------------------------|
| <b>Syntax Description</b> | <community-list-name>                                                             | Name of community list |
| <b>Default</b>            | N/A                                                                               |                        |
| <b>Configuration Mode</b> | Config Route Map                                                                  |                        |
| <b>History</b>            | 3.3.5200                                                                          |                        |
| <b>Role</b>               | admin                                                                             |                        |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set community internet 1:3<br>additive |                        |
| <b>Related Commands</b>   | N/A                                                                               |                        |
| <b>Note</b>               |                                                                                   |                        |

## set community-list additive

**set community-list <community-list-name> additive**

**no set community <list of communities> additive**

Adds to existing communities using the communities found in the community list.  
The no form of the command removes the set statement from the clause.

|                           |                                                                                    |
|---------------------------|------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <community-list-name>      Name of community list                                  |
| <b>Default</b>            | N/A                                                                                |
| <b>Configuration Mode</b> | Config Route Map                                                                   |
| <b>History</b>            | 3.3.5200                                                                           |
| <b>Role</b>               | admin                                                                              |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set community-list mycommunity additive |
| <b>Related Commands</b>   | N/A                                                                                |
| <b>Note</b>               |                                                                                    |

## set community-list delete

**set community-list <community-list-name> delete**  
**no set community-list**

Deletes the matching community list permit entries from the route community list  
The no form of the command removes the set statement from the clause.

|                           |                                                                                  |                        |
|---------------------------|----------------------------------------------------------------------------------|------------------------|
| <b>Syntax Description</b> | community-list-name                                                              | Name of community list |
| <b>Default</b>            | N/A                                                                              |                        |
| <b>Configuration Mode</b> | Config Route Map                                                                 |                        |
| <b>History</b>            | 3.3.5200                                                                         |                        |
| <b>Role</b>               | admin                                                                            |                        |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set community-list mycommunity delete |                        |
| <b>Related Commands</b>   | N/A                                                                              |                        |
| <b>Note</b>               |                                                                                  |                        |



## set ip next-hop

**set ip next-hop <value>**

**no set ip next-hop**

Configures a route's entry next-hop parameter.

The no form of the command removes a route-map's entry next-hop setting.

|                           |                                                                        |                                               |
|---------------------------|------------------------------------------------------------------------|-----------------------------------------------|
| <b>Syntax Description</b> | value                                                                  | Route next-hop IP: A.B.C.D (e.g. 10.0.13.86). |
| <b>Default</b>            | N/A                                                                    |                                               |
| <b>Configuration Mode</b> | Config Route Map                                                       |                                               |
| <b>History</b>            | 3.3.5200                                                               |                                               |
| <b>Role</b>               | admin                                                                  |                                               |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set ip next-hop 10.10.10.10 |                                               |
| <b>Related Commands</b>   | N/A                                                                    |                                               |
| <b>Note</b>               |                                                                        |                                               |

## set local-preference

**set local-preference <value>**

**no set local-preference**

Configures a route's entry local-preference parameter.

The no form of the command removes a route-map's entry local-pref setting.

|                           |                                                                    |                                 |
|---------------------------|--------------------------------------------------------------------|---------------------------------|
| <b>Syntax Description</b> | value                                                              | Route local-pref: 1-2147483648. |
| <b>Default</b>            | N/A                                                                |                                 |
| <b>Configuration Mode</b> | Config Route Map                                                   |                                 |
| <b>History</b>            | 3.3.5200                                                           |                                 |
| <b>Role</b>               | admin                                                              |                                 |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set local-preference 10 |                                 |
| <b>Related Commands</b>   | N/A                                                                |                                 |
| <b>Note</b>               |                                                                    |                                 |

## set metric

**set metric <value>**

**no set metric**

Configures a route's entry metric parameter.

The no form of the command removes a route-map's entry metric setting.

|                           |                                                          |                             |
|---------------------------|----------------------------------------------------------|-----------------------------|
| <b>Syntax Description</b> | value                                                    | Route metric: 1-2147483647. |
| <b>Default</b>            | N/A                                                      |                             |
| <b>Configuration Mode</b> | Config Route Map                                         |                             |
| <b>History</b>            | 3.3.5200                                                 |                             |
| <b>Role</b>               | admin                                                    |                             |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set metric 10 |                             |
| <b>Related Commands</b>   | N/A                                                      |                             |
| <b>Note</b>               |                                                          |                             |

## set origin

**set origin {egp | igp | incomplete}**  
**no set origin**

Configures a route's entry origin parameter.  
 The no form of the command removes a route-map's entry origin setting.

|                           |                                                           |                                                     |
|---------------------------|-----------------------------------------------------------|-----------------------------------------------------|
| <b>Syntax Description</b> | egp                                                       | Set a route's entry origin parameter to external.   |
|                           | igp                                                       | Set a route's entry origin parameter to internal.   |
|                           | incomplete                                                | Set a route's entry origin parameter to incomplete. |
| <b>Default</b>            | N/A                                                       |                                                     |
| <b>Configuration Mode</b> | Config Route Map                                          |                                                     |
| <b>History</b>            | 3.3.5200                                                  |                                                     |
| <b>Role</b>               | admin                                                     |                                                     |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set origin egp |                                                     |
| <b>Related Commands</b>   | N/A                                                       |                                                     |
| <b>Note</b>               |                                                           |                                                     |

## set tag

**set tag <value>**

**no set tag**

Configures a route's entry tag parameter.

The no form of the command removes a route-map's entry tag setting.

|                           |                                                       |                         |
|---------------------------|-------------------------------------------------------|-------------------------|
| <b>Syntax Description</b> | value                                                 | Range: 1-2147483647.    |
| <b>Default</b>            | N/A                                                   |                         |
| <b>Configuration Mode</b> | Config Route Map                                      |                         |
| <b>History</b>            | 3.3.5200                                              |                         |
|                           | 3.4.0000                                              | Updated parameter range |
| <b>Role</b>               | admin                                                 |                         |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set tag 10 |                         |
| <b>Related Commands</b>   | N/A                                                   |                         |
| <b>Note</b>               |                                                       |                         |

## set weight

**set weight <number>**

**no set weight**

Configures modifications to redistributed routes.

The no form of the command removes this configuration from the route map clause.

|                           |                                                         |                                             |
|---------------------------|---------------------------------------------------------|---------------------------------------------|
| <b>Syntax Description</b> | number                                                  | Value of the weight to set. Range: 1-65535. |
| <b>Default</b>            | N/A                                                     |                                             |
| <b>Configuration Mode</b> | Config Route Map                                        |                                             |
| <b>History</b>            | 3.3.5006                                                | First version                               |
|                           | 3.4.0000                                                | Updated parameter range                     |
| <b>Role</b>               | admin                                                   |                                             |
| <b>Example</b>            | switch (config route-map mymap permit 10)# set weight 7 |                                             |
| <b>Related Commands</b>   | route-map <map-name> [deny   permit] [sequence-number]  |                                             |
| <b>Note</b>               |                                                         |                                             |

## show route-map

**show route-map [<name>]**

Displays route map configuration.

|                           |                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                          |
| <b>History</b>            | 3.3.5006                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config)# show route-map mymap route-map mymap, permit, sequence 1200   Set clauses:     continue 1800 switch (config)#</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                           |

## 6.5.2 IP Prefix-List

Prefix-list is a list of entries, each of which can match one or more IP prefixes. A prefix-list is usually used to match a specific IP prefix, mostly in relation to IP route destinations.

The prefix is considered to match the list if one of the entries match the prefix; the entry itself can be marked as a “permit” entry or a “deny” entry, which can be used by the matching code to decide if the route is to be accepted or not.

The prefix is matched to the prefix-list entries in the order of the sequence number of the entries in the list.



### 6.5.2.1 Commands

## ip prefix-list

**ip prefix-list** <list-name> [seq <number>] {permit | deny} <ip> [eq <length> | <prefix> [eq <length> | le <length> | ge <length> [le <length>]]]  
**no ip prefix-list** <list-name> [seq <number>]

Creates or updates a prefix-list.  
 The no form of the command deletes a prefix-list or a prefix-list entry

|                           |                                                                                               |                                                                                                                                                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | list-name                                                                                     | String                                                                                                                                                                                                                |
|                           | seq <number>                                                                                  | Sequence number assigned to entry. Range: 0-65535.                                                                                                                                                                    |
|                           | permit                                                                                        | Permits access for a matching condition.                                                                                                                                                                              |
|                           | deny                                                                                          | Denies access for a matching condition.                                                                                                                                                                               |
|                           | ip                                                                                            | IP address                                                                                                                                                                                                            |
|                           | eq   ge   le <mask>                                                                           | <ul style="list-style-type: none"> <li>eq: Equal to a specified prefix length</li> <li>ge: Greater than or equal to a specified prefix length</li> <li>le: Less than or equal to a specified prefix length</li> </ul> |
| <b>Default</b>            | Sequence value = 10                                                                           |                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                        |                                                                                                                                                                                                                       |
| <b>History</b>            | 3.3.5200                                                                                      |                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                         |                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch (config)# ip prefix-list a-list permit 10.20.0.0 /16 eq 24 switch (config)#</pre> |                                                                                                                                                                                                                       |
| <b>Related Commands</b>   | N/A                                                                                           |                                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                               |                                                                                                                                                                                                                       |

## show ip prefix-list

**show ip prefix-list [<name>]**

Displays prefix-lists.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | name                                                                                                                                                                                                                                                                                                                                                                                                   | Displays a specific prefix-list. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                       |                                  |
| <b>History</b>            | 3.3.5200                                                                                                                                                                                                                                                                                                                                                                                               |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |
| <b>Example</b>            | <pre>switch (config)# show ip prefix-list prefix-list: a-list   count: 1, range entries: 1, sequences: 10 - 10   seq 10 permit 10.20.0.0 /16 ge 24 (hit count: 0, refcount: 0) prefix-list: b-list   count: 2, range entries: 2, sequences: 10 - 20   seq 10 deny 10.10.0.0 /16 le 24 (hit count: 0, refcount: 0)   seq 20 deny 10.20.0.0 /16 le 24 (hit count: 0, refcount: 0) switch (config)#</pre> |                                  |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |

## 6.6 Multicast (IGMP and PIM)

Protocol independent multicast (PIM) is a collection of protocols that deal with efficient delivery of IP multicast (MC) data. Those protocols are published in the series of RFCs and define different ways and aspects of multicast data distribution. PIM protocol family includes PIM dense mode (PIM-DM), PIM sparse mode (PIM-SM), Bidirectional PIM (PIM-BIDIR) and Bootstrap router (BSR) protocol.

PIM builds and maintains multicast routing tables based on the unicast routing information provided by unicast routing tables that can be maintained statically or dynamically by IP routing protocols like OSPF and BGP.

### 6.6.1 Basic PIM-SM

PIM relies on the underlying topology gathering protocols that collect unicast routing information and build multicast routing information base (MRIB). The primary role of MRIB is to determine the next hop for PIM messages. MC data flows along with the reverse path of the PIM control.

MC tree construction contains three phases:

1. Construction of a shared distribution tree. This tree is built around a special designated router (DR) called the rendezvous point (RP).
2. Establishing a native forwarding path from MC sources to the RP
3. Building an optimized MC distribution tree from each MC source to all MC targets bypassing the RP

The first stage of the multicast tree establishment starts when the MC receiver expresses desire to start receiving MC data. It can happen as a result of using one of the L2 protocols like MLD or IGMP, or by static configuration. When such request is received by the last hop router (a designated router) this router starts to build a distribution path from the RP. It starts to send periodic “Join” messages to the nearest PIM neighbor router towards the RP. The next router continues to do the same. Eventually the process converges when Join messages reach RP or a router that has already created that distribution tree. Usually that tree is called a shared tree because it is created for any source for specific MC group G and is noted as (\*,G).

At that stage, MC senders can start sending MC data. The DR next to the MC source extracts the packets from the data flow and tunnels them to the RP. The RP decapsulates the packets and distributes them to all MC receivers along with the share tree.

On the second stage the RP switches from tunneling of multicast packets from MC sources to forwarding native traffic. When the RP identifies that a new MC source started to send packets, it initiates an establishment of a native forwarding path from the DR of that source to itself. For this purpose it starts to send Join messages towards MC source to nearest neighbor to that source according the MRIB. This is a source specific Join and is noted as (S,G). When data path is established up to the DR, the DR switches from tunneling MC packets to their native forwarding, so the RP does not need to decapsulate MC packets anymore, but still continue to distribute the packets along with shared tree.

On the third phase multicast receivers will try to switch from shared tree to source specific tree by creating a direct distribution path from a multicast source. When last hop router of the multicast receiver identifies multicast traffic coming from any multicast source it will start to send Join messages towards the source with purpose to create a direct source specific path to that source. Once such path will be established and Designated router that is attached to the source L2

network will start to distribute the multicast traffic directly bypassing shared tree, the last hop router will detach its receivers from shared tree for that data and will switch to the shortest path tree distribution.

### 6.6.2 Bidirectional PIM

Bidirectional PIM (PIM-BIDIR) is a variant of PIM-SM that builds bidirectional distribution trees that connect multicast senders and receivers. It differs from PIM-SM by eliminating a need to tunnel multicast packets to RP and to keep a state for each (S,G) pair. It also eliminates a need in data driven protocol events. PIM-BIDIR achieves it by defining a new role, Designated Forwarder (DF), and by defining new forwarding rules and keeping all other PIM-SM mechanisms intact.

DF is a PIM enabled router that is the closest router to RP among all PIM routers residing on specific L2 network. It is dynamically elected by all PIM routers on that network. DF is required on each L2 multicast capable network for each RP. DF serves all multicast groups that share the same RP and has following duties:

- It is an only router that is responsible to receive and forward upstream multicast packets on that L2 segment
- It is a router that should collect all Join requests from the routers on that L2 segment
- It is an only router that will distribute downstream multicast packets on that segment.

Once Designated forwarders are elected and forwarding rules are established, PIM routers can start to issue (\*,G) Join messages and build shared distribution trees. When shared tree is created, multicast sources can start to exchange data with receivers and it doesn't require any additional maintenance of the multicast states.

Compared to PIM-SM, in bidirectional PIM:

- Each router will keep only (\*,G) state and not (\*,G) and (S,G) like in PIM-SM
- Multicast traffic from the beginning is forwarded naturally - no need to tunnel data to RP
- Resulting multicast tree is not shortest path optimal and converges around selected Rendezvous point, but is shared among all participants in that multicast group

In BIDIR-PIM, the packet forwarding rules have been improved over PIM-SM, allowing traffic to be passed up the shared tree toward the RP. To avoid multicast packet looping, bidir-PIM introduces a new mechanism called designated forwarder (DF) election, which establishes a loop-free SPT rooted at the RP.

### 6.6.3 Bootstrap Router

For correct operation each PIM router requires a capability to map a multicast group that it needs to serve to a Rendezvous point for that group. This mapping can be done manually or the mapping can be distributed dynamically in the network. BSR protocol serves for this purpose.

This protocol introduces new role in the multicast network – Bootstrap router. That router is responsible to flood multicast group to RP mapping through the multicast routing domain. Bootstrap router is elected dynamically among bootstrap router candidates (C-BSR) and once elected will collect from Rendezvous point candidate (C-RP) mapping information and distribute it in the domain.

Bootstrap activity contains 4 steps. First each C-BSR configured in the network originates floods into the network bootstrap messages that express the router desire to become BSR and also its

BSR priority. Any C-BSR that receives that information and has lower priority will suspend itself, so eventually only one router will send BSR messages and become BSR.

When BSR is elected all RP candidates start to advertise to BSR a list of groups that this RP can serve. On the next step, after BSR learns the group mapping proposals, it forms a final group to RP mapping in the domain and starts to distribute it among PIM routers in the multicast routing domain. When PIM router receives BSR message with the group to RP mapping, it installs that mapping in the router local cache and uses that information to create multicast distribution trees.

## 6.6.4 Configuring Multicast

### Precondition steps:

**Step 1.** Enable IP routing functionality. Run:

```
switch (config)# ip routing
```

**Step 2.** Enable the desired VLAN. Run:

```
switch (config)# vlan 10
```

**Step 3.** Add this VLAN to the desired interface. Run:

```
switch (config)# interface ethernet 1/1
switch (config ethernet 1/1)#switchport access vlan 10
```

**Step 4.** Create a VLAN interface. Run:

```
switch (config)# interface vlan 10
```

**Step 5.** Apply IP address to the VLAN interface. Run:

```
switch (config interface vlan 10)# ip address 10.10.10.10 /24
```

**Step 6.** Enable the interface. Run:

```
switch (config interface vlan 10)# no shutdown
```

### 6.6.4.1 Configuring IGMP

IGMP is enabled when IP multicast is enabled and static multicast or PIM is enabled on the interface.

### 6.6.4.2 Verifying IGMP

**Step 1.** Display a brief IGMP interface status. Run:

```
switch (config)# show ip igmp interface brief
IGMP Interfaces for VRF "default", Count: 1
Interface IP Address IGMP Querier Membership Version
VLAN10 10.10.10.1 10.10.10.1 5 v2
```

**Step 2.** Display detailed IGMP interface status. Run:

```
switch (config)#show ip igmp interface vlan 10
IGMP Interfaces for VRF "default"

VLAN10
Interface status: protocol-up/admin-up/link-up
IP address: 10.10.10.1, IP Subnet: 10.10.10.0/24
Active Querier: 10.10.10.1
Membership count: 5
Route-queue depth: 0
IGMP Version: 2
IGMP query interval: 125 secs, configured value: 125 secs
IGMP max response time: 10 secs, configured value: 10 secs
IGMP startup query interval: 125 secs, configured value: 125 secs
IGMP startup query count: 2
IGMP group timeout: 260 secs, configured value: 260 secs
IGMP querier timeout: 260 secs configured value: 260 secs
IGMP last member mrt: 25 secs configured value: 25
IGMP robustness variable: 2
IGMP interface immediate leave: Disabled
IGMP interface statistics:
General (sent/received):
v1/v2-reports: 0/10
v2-queries: 271/0,v2-leaves: 0/0
v3-queries: 0/0,
v3-reports: 0/0
switch (config)#
```

**Step 3.** Display the list of IGMP groups and their status. Run:

```
switch (config)#show ip igmp groups
IGMP Connected Group Membership for VRF "default", - 2 total entries
Type: S - Static, D - Dynamic, L - Local, T - SSM Translated
Group Address Type Interface Uptime Expires Last
Reporter
226.0.1.0 D vlan10 [0d 00:00:07.46] [0d 00:04:05.08] 10.10.10.2
226.0.1.1 D vlan10 [0d 00:00:07.47] [0d 00:04:05.08] 10.10.10.2
switch (config)#
```

### 6.6.4.3 Configuring PIM

#### Prerequisites:

**Step 1.** If not enabled, enable IP routing. Run:

```
switch (config)# ip routing
```

**Step 2.** Globally enable multicast routing. Run:

```
switch (config)# ip multicast-routing
```

➤ **To configure PIM:**

**Step 1.** Enable PIM. Run:

```
switch (config)# protocol pim
```

**Step 2.** Globally enable Bidirectional PIM (BIDIR mode). Run:

```
switch (config)# no ip pim bidir shutdown
```

## 6.6.5 Commands

### 6.6.5.1 PIM

#### protocol pim

**protocol pim**  
**no protocol pim**

Enables protocol independent multicast (PIM).  
The no form of the command hides all PIM commands and deletes all PIM configurations.

|                           |                                |
|---------------------------|--------------------------------|
| <b>Syntax Description</b> | N/A                            |
| <b>Default</b>            | Disabled                       |
| <b>Configuration Mode</b> | Config                         |
| <b>History</b>            | 3.3.5006                       |
| <b>Role</b>               | admin                          |
| <b>Example</b>            | switch (config) # protocol pim |
| <b>Related Commands</b>   | N/A                            |
| <b>Note</b>               |                                |



## ip pim bidir shutdown

**ip pim bidir shutdown**  
**no ip pim bidir shutdown**

Disables PIM bidir.  
The no form of the command enables PIM bidir.

|                           |                                            |
|---------------------------|--------------------------------------------|
| <b>Syntax Description</b> | N/A                                        |
| <b>Default</b>            | Disabled                                   |
| <b>Configuration Mode</b> | Config                                     |
| <b>History</b>            | 3.3.5006                                   |
| <b>Role</b>               | admin                                      |
| <b>Example</b>            | switch (config) # no ip pim bidir shutdown |
| <b>Related Commands</b>   | N/A                                        |
| <b>Note</b>               |                                            |

## ip pim rp-address

**ip pim rp-address <rp-address> [group-list <ip-address> <prefix>] [override]**  
**bidir**  
**no ip pim rp-address <rp-address> [group-list <ip-address> <prefix>]**

Configures a static IP address of a rendezvous point for a multicast group range or adds new multicast range to existing RP.

The no form of the command removes the rendezvous point for a multicast group range or removes all configuration of the RP.

|                           |                                                       |                                                                                     |
|---------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | rp-address                                            | The static IP address of rendezvous point.                                          |
|                           | ip-address                                            | IP address of the group-range (coupled with the prefix parameter).                  |
|                           | prefix                                                | Network prefix (in the format of /24, or 255.255.255.0 for example) of group range. |
|                           | override                                              | Specifies that this configuration overrides dynamic configuration learned by BSR.   |
|                           | bidir                                                 | Specifies that the group range uses a bidirectional PIM.                            |
| <b>Default</b>            | N/A                                                   |                                                                                     |
| <b>Configuration Mode</b> | Config                                                |                                                                                     |
| <b>History</b>            | 3.3.5006                                              |                                                                                     |
| <b>Role</b>               | admin                                                 |                                                                                     |
| <b>Example</b>            | switch (config) # ip pim rp-address 10.10.10.10 bidir |                                                                                     |
| <b>Related Commands</b>   | N/A                                                   |                                                                                     |
| <b>Note</b>               |                                                       |                                                                                     |

## ip pim bsr-candidate

```
ip pim bsr-candidate {vlan <vlan-id> | loopback <number> | ethernet <port>}
[hash-len <hash-length>] [priority <priority>] [interval <interval>]
no ip pim bsr-candidate {vlan <vlan-id> | loopback <number> | ethernet <port>}
[hash-len <hash-length>] [priority <priority>] [interval <interval>]
```

Configures the switch as a candidate BSR router (C-BSR).  
The no form of the command removes BSR-candidate configuration or restores default parameters values.

|                           |                                                                                                                                                                                    |                                                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Syntax Description</b> | vlan <vlan-id>                                                                                                                                                                     | The VLAN ID. Range is 1-4094.                                                |
|                           | loopback <number>                                                                                                                                                                  | Loopback interface number.                                                   |
|                           | ethernet <port>                                                                                                                                                                    | Ethernet interface.                                                          |
|                           | hash-len                                                                                                                                                                           | Specifies the hash mask length used in BSR messages.<br>Range: 0-32.         |
|                           | priority                                                                                                                                                                           | BSR priority rating. Larger numbers denote higher priority.<br>Range: 0-255. |
|                           | interval                                                                                                                                                                           | Period between the transmission of BSMs (seconds).<br>Range:10-536870906.    |
| <b>Default</b>            | The interface is not BSR candidate by default.<br>priority: 64<br>interval: 60<br>hash-len: 30                                                                                     |                                                                              |
| <b>Configuration Mode</b> | Config<br>Config Interface Ethernet configured as a router port<br>Config Interface Loopback<br>Config Interface Port Channel configured as a router port<br>Config Interface VLAN |                                                                              |
| <b>History</b>            | 3.3.5006                                                                                                                                                                           |                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                              |                                                                              |
| <b>Example</b>            | switch (config) # ip pim bsr-candidate vlan 10 priority 100                                                                                                                        |                                                                              |

---

**Related Commands** ip pim sparse-mode

---

**Note**

- IP PIM sparse-mode must be enabled on the interface.
  - A BSR is a PIM router within the PIM domain through which dynamic RP selection is implemented. The BSR selects RPs from a list of candidate RPs and exchanges bootstrap messages (BSM) with all routers in the domain. The BSR is elected from one of the C-BSRs through an exchange of BSMs. A subset of PIM routers within the domain are configured as candidate Bootstrap routers (C-BSRs). Through the exchange of Bootstrap messages (BSMs), the C-BSRs elect the BSR, which then uses BSMs to inform all domain routers of its status.
  - Command parameters specify the switch's BSR address, the interval between BSM transmissions, hash length used for RP calculations and the priority assigned to the switch when electing a BSR.
  - Entering an ip pim bsr-candidate command replaces any previously configured bsr-candidate command. If the new command does not specify a priority or interval, the previously configured values persist in running-config.
- 
-

## ip pim bsr-holdtime

**ip pim bsr-holdtime <period>**  
**no ip pim bsr-holdtime**

Configures the timeout period an elected BSR remains valid after receiving a BSM.  
 The no form of the command resets the parameters to their default.

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| <b>Syntax Description</b> | period<br>In seconds. Range: 12-1073741823 (1.073 billion). |
| <b>Default</b>            | period = 2*(BSR candidate interval) + 10                    |
| <b>Configuration Mode</b> | Config                                                      |
| <b>History</b>            | 3.3.5006                                                    |
| <b>Role</b>               | admin                                                       |
| <b>Example</b>            | switch (config) # ip pim bsr-holdtime 30                    |
| <b>Related Commands</b>   |                                                             |
| <b>Note</b>               |                                                             |

## ip pim rp-candidate

**ip pim rp-candidate** {vlan <vlan-id> | loopback <number> | ethernet <slot/port>} group-list <ip-address> <prefix> [bidir] [priority <priority>] [interval <interval>]

**no ip pim rp-candidate** {vlan <vlan-id> | loopback <number> | ethernet <slot/port>} group-list <ip-address> <prefix> [bidir] [priority <priority>] [interval <interval>]

Configures the switch as a candidate rendezvous point (C-RP).

The no form of the command removes the ip pim rp-candidate from running-config command for the specified multicast group.

|                           |                                                                                                                                                                                    |                                                                               |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ethernet <slot/port>                                                                                                                                                               | Ethernet interface.                                                           |
|                           | port-channel <number>                                                                                                                                                              | LAG interface.                                                                |
|                           | vlan <vlan-id>                                                                                                                                                                     | VLAN ID. Range: 1-4094.                                                       |
|                           | loopback <number>                                                                                                                                                                  | Loopback interface number.                                                    |
|                           | ip-address                                                                                                                                                                         | The group IP address.                                                         |
|                           | prefix                                                                                                                                                                             | Network prefix (for example /24, or 255.255.255.0).                           |
|                           | priority                                                                                                                                                                           | RP priority rating. Range: 0-255, where smaller numbers mean higher priority. |
|                           | interval                                                                                                                                                                           | RP-advertisements message transmission interval. Range: 0-16383.              |
| <b>Default</b>            | The RP priority is 192.<br>The BSR message interval is 60 seconds.                                                                                                                 |                                                                               |
| <b>Configuration Mode</b> | Config<br>Config Interface Ethernet configured as a router port<br>Config Interface Loopback<br>Config Interface Port Channel configured as a router port<br>Config Interface VLAN |                                                                               |
| <b>History</b>            | 3.3.5006                                                                                                                                                                           |                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                              |                                                                               |
| <b>Example</b>            | switch (config) # ip pim rp-candidate vlan 19 group-list 225.6.5.0 /25<br>priority 20 interval 30 bidir                                                                            |                                                                               |

---

**Related Commands**

N/A

---

**Note**

- The BSR selects a multicast group's dynamic RP set from the list of C-RPs in the PIM domain. The command specifies the interface (used to derive the RP address), C-RP advertisement interval, and priority rating. The BSR selects the RP set by comparing C-RP priority ratings. The C-RP advertisement interval specifies the period between successive C-RP advertisement message transmissions to the BSR.
  - Running-config supports multiple multicast groups through multiple `ip pim rp-candidate` statements:
  - All commands must specify the same interface. Issuing a command with an interface that differs from existing commands removes all existing commands from running-config.
  - Running-config stores the interval and priority setting in a separate statement that applies to all rp-candidate statements. When a command specifies an interval that differs from the previously configured value, the new value replaces the old value and applies to all configured rp-candidate statements. The default interval value is 60 seconds.
  - When the no commands do not specify a multicast group, all rp-candidate statements are removed from running-config. The `no ip pim rp-candidate interval` commands restore the interval setting to the default value of 60 seconds.
  - When setting a priority, all previous rp-candidates within all interfaces and groups are configured to this priority.
-

## ip pim sparse-mode

**ip pim sparse-mode**  
**no ip pim sparse-mode**

Sets PIM sparse mode on this interface.  
 The no form of the command disables the sparse-mode on the interface and deletes all interfaces configuration.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Disabled                                                                                                                                    |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.5006                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10) # ip pim sparse-mode                                                                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                             |



## ip pim dr-priority

**ip pim dr-priority <priority>**  
**no ip pim dr-priority**

Configures the designated router (DR) priority of PIM Hello messages.  
 The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                                                                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | priority                                                                                                                                    | The designated router priority of the PIM Hello messages. Range is 1-4294967295. |
| <b>Default</b>            | 1                                                                                                                                           |                                                                                  |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                  |
| <b>History</b>            | 3.3.5006                                                                                                                                    |                                                                                  |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                  |
| <b>Example</b>            | switch (config interface vlan 10) # ip pim dr-priority 5                                                                                    |                                                                                  |
| <b>Related Commands</b>   | ip pim sparse-mode                                                                                                                          |                                                                                  |
| <b>Note</b>               | The command “ip pim sparse-mode” must be run prior to using this command.                                                                   |                                                                                  |

## ip pim hello-interval

**ip pim hello-interval <interval>**

**no ip pim hello-interval**

Configures PIM Hello interval in milliseconds.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Syntax Description</b> | interval                                                                                                                                    | PIM Hello interval in milliseconds.<br>Range:1000-65535000. |
| <b>Default</b>            | 30,000 milliseconds                                                                                                                         |                                                             |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                             |
| <b>History</b>            | 3.3.5006                                                                                                                                    |                                                             |
| <b>Role</b>               | admin                                                                                                                                       |                                                             |
| <b>Example</b>            | switch (config interface vlan 10) # ip pim hello-interval 70000                                                                             |                                                             |
| <b>Related Commands</b>   | ip pim sparse-mode                                                                                                                          |                                                             |
| <b>Note</b>               | The command “ip pim sparse-mode” must be run prior to using this command.                                                                   |                                                             |

## ip pim join-prune-interval

**ip pim join-prune-interval <period>**  
**no ip pim join-prune-interval**

Configures the period between Join/Prune messages that the configuration mode interface originates and sends to the upstream RPF neighbor.  
 The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Syntax Description</b> | period                                                                                                                                      | Range: 1-1000000 seconds. |
| <b>Default</b>            | 60 seconds                                                                                                                                  |                           |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                           |
| <b>History</b>            | 3.3.5200                                                                                                                                    |                           |
| <b>Role</b>               | admin                                                                                                                                       |                           |
| <b>Example</b>            | switch (config interface vlan 10) # ip pim join-prune-interval 60                                                                           |                           |
| <b>Related Commands</b>   |                                                                                                                                             |                           |
| <b>Note</b>               |                                                                                                                                             |                           |

## ip pim border

**ip pim border**  
**no ip pim border**

Configures an interface on an IPv4 PIM border.  
 The no form of the command removes the interface from being a PIM border.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Disabled                                                                                                                                    |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.5006                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10) # ip pim border                                                                                           |
| <b>Related Commands</b>   |                                                                                                                                             |
| <b>Note</b>               | PIM border blocks PIM control traffic, but sends and receives all multicast traffic.                                                        |

## ip pim bsr-border

**ip pim bsr-border**  
**no ip pim bsr-border**

Prevents the switch from sending bootstrap router messages (BSMs) over the configuration mode interface.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | no pim bsr-border                                                                                                                           |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.5200                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10) # ip pim bsr-border                                                                                       |
| <b>Related Commands</b>   |                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                             |

## debug ethernet ip pim

**debug ethernet ip pim {all | control-plane | data-path | fail-all | init-shut | management | memory | packet-dump | resources}**  
**no debug ethernet ip pim {all | control-plane | data-path | fail-all | init-shut | management | memory | packet-dump | resources}**

Configures the trace level for PIM.

The no form of the command removes the trace level for PIM.

|                           |                                            |                                                 |
|---------------------------|--------------------------------------------|-------------------------------------------------|
| <b>Syntax Description</b> | all                                        | Enable track traces.                            |
|                           | control-plane                              | Control plane traces.                           |
|                           | data-path                                  | IP packet dump trace.                           |
|                           | fail-all                                   | All failures including Packet Validation Trace. |
|                           | init-shut                                  | Init and shutdown messages.                     |
|                           | management                                 | Management messages.                            |
|                           | memory                                     | Memory related messages.                        |
|                           | packet-dump                                | Packet dump messages.                           |
|                           | resources                                  | OS Resource trace.                              |
| <b>Default</b>            | N/A                                        |                                                 |
| <b>Configuration Mode</b> | Config                                     |                                                 |
| <b>History</b>            | 3.3.5200                                   |                                                 |
| <b>Role</b>               | admin                                      |                                                 |
| <b>Example</b>            | switch (config)# debug ethernet ip pim all |                                                 |
| <b>Related Commands</b>   |                                            |                                                 |
| <b>Note</b>               |                                            |                                                 |

## show ip pim protocol

### show ip pim protocol

Displays PIM protocol information (counters).

|                    |                                                             |          |      |         |
|--------------------|-------------------------------------------------------------|----------|------|---------|
| Syntax Description | N/A                                                         |          |      |         |
| Default            | N/A                                                         |          |      |         |
| Configuration Mode | Any Command Mode                                            |          |      |         |
| History            | 3.3.5200                                                    |          |      |         |
| Role               | admin                                                       |          |      |         |
| Example            | switch (config) # show ip pim protocol PIM Control Counters |          |      |         |
|                    |                                                             | Received | Sent | Invalid |
|                    | Assert                                                      | 0        | 0    | 0       |
|                    | Bootstrap Router                                            | 0        | 0    | 0       |
|                    | CRP Advertisement                                           | 0        | 0    | 0       |
|                    | Graft                                                       | 0        | 0    | 0       |
|                    | Grapt Ack                                                   | 0        | 0    | 0       |
|                    | Hello                                                       | 0        | 0    | 0       |
|                    | J/P                                                         | 0        | 0    | 0       |
|                    | Register                                                    | 0        | 0    | 0       |
|                    | Register Stop                                               | 0        | 0    | 0       |
|                    | State Refresh                                               | 0        | 0    | 0       |
|                    | switch (config) #                                           |          |      |         |
| Related Commands   |                                                             |          |      |         |
| Note               |                                                             |          |      |         |

## show ip pim bsr

### show ip pim bsr

Displays PIM BSR information.

|                           |                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>arc-switch14 [standalone: master] (config) # show ip pim bsr PIMv2 Bootstrap information   BSR address: 4.4.4.14   Uptime:      00:00:30, BSR Priority: 0, Hash mask length: 30   Expires:     00:00:57 This system is a candidate BSR   Candidate BSR address: 4.4.4.14, priority: 0, hash mask length: 30                         interval: 60, holdtime: 130</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                            |



## show ip pim neighbor

**show ip pim neighbor [vlan <vlan-id> | <other interfaces> | <ip-addr>]**

Displays information about IPv4 PIM neighbors.

|                           |                                                                                                                                                                                                                                                                                               |                                                      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>Syntax Description</b> | vlan <vlan-id>                                                                                                                                                                                                                                                                                | Filters the output per specific VLAN ID.             |
|                           | neighbor-addr                                                                                                                                                                                                                                                                                 | Filters the output per specific neighbor IP address. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                           |                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                              |                                                      |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                      |                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                         |                                                      |
| <b>Example</b>            | <pre>switch (config) # show ip pim neighbor PIM Neighbor Status for VRF "default" Neighbor      Interface      Uptime    Expires    Ver    DR Prio Mode 5.5.5.1       VLAN5             10:36:45  00:01:43   1 9.9.9.1       VLAN9             10:36:42  00:01:43   1 switch (config) #</pre> |                                                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                               |                                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                               |                                                      |

## show ip pim rp

**show ip pim rp <rp-address>**

Displays information about the rendezvous points (RPs) for PIM.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Syntax Description</b> | rp-address                                                                                                                                                                                                                                                                                                                                                                                       | A rendezvous points address. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                              |                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                 |                              |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                         |                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                            |                              |
| <b>Example</b>            | <pre>switch(config)# show ip pim rp PIM RP Status Information for VRF "default" BSR: 10.10.10.10, expires: 00:01:16,     priority: 255, hash-length: 0 RP: 11.11.11.11, expires: 00:01:36     priority: 0, RP-source: 10.10.10.10, group ranges:     225.10.0.0/24 RP: 8.8.8.2, expires: 00:01:36     priority: 0, RP-source: 10.10.10.10, group ranges:     225.12.0.0/24 switch(config)#</pre> |                              |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                  |                              |

## show ip pim rp-hash

**show ip pim rp-hash <group>**

Displays the hashed value of the group (RP address according the group address).

|                           |                                                                                                                                                                                                                            |                                                               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Syntax Description</b> | group                                                                                                                                                                                                                      | Filters the output per a specific IP Multicast group address. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                        |                                                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                           |                                                               |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                   |                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                      |                                                               |
| <b>Example</b>            | <pre>switch (config) # show ip pim rp-hash 225.7.6.2 RP 20.20.20.49, v2 Info Source: 20.20.20.49, via bootstrap, priority 60, holdtime 57 Expires: 00:00:53 PIMv2 Hash Value (mask 255.255.255.252) switch (config)#</pre> |                                                               |
| <b>Related Commands</b>   |                                                                                                                                                                                                                            |                                                               |
| <b>Note</b>               |                                                                                                                                                                                                                            |                                                               |

## show ip pim rp-candidate

### show ip pim rp-candidate

Displays information about RP candidate status.

|                           |                                                                                                                                                                                                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                           |
| <b>Default</b>            | N/A                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                              |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config)# show ip pim rp-candidate  Next Candidate-RP-Advertisement in 00:11:22/00:60:00 RP: 10.10.10.10 group prefixes priority 224.0.0.0/4      190 225.0.0.0/4      191 switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                               |
| <b>Note</b>               |                                                                                                                                                                                                               |

## show ip pim interface

**show ip pim interface** {[vlan <vlan id> | ethernet <port>] [df] | brief}

Displays information about the enabled interfaces for PIM.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | vlan <vlan-id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Filters the output for specific interface.                |
|                           | ethernet <port>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ethernet interface.                                       |
|                           | df                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays information about elected designated forwarders. |
|                           | brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays a summary of information for all interfaces.     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                           |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                           |
| <b>Example</b>            | <pre># arc-switch55 [standalone: master] (config) # show ip pim interface vlan 2919 Interface Vlan2919 address is 70.28.23.80 PIM: enabled PIM version: 2, mode: sparse PIM DR: 70.28.23.80 (this system) PIM DR Priority: 1 PIM configured DR priority: PIM neighbor count: 1 PIM neighbor holdtime: 105 secs PIM Hello Interval: 30 seconds, next hello sent in: 00:00:28 PIM Hello Generation ID: 61345 PIM Join-Prune Interval: 60 seconds PIM domain border: no PIM Interface Statistics:     General (sent/received):         Hellos: 36/37, JPs: 0/0, Asserts: 0/0         Grafts: 0/0, Graft-Acks: 0/0         DF-Offers: 0/0, DF-Winners: 0/0, DF-Backoffs: 0/0, DF-         Passes: 0/0     Errors:         Checksum errors: 0, Invalid packet types/DF subtypes: 0/0         Authentication failed: 0         Packets from non-neighbors: 1         JPs received on RPF-interface: 0         (*,G) Joins received with no/wrong RP: 0/0         (*,G)/(S,G) JPs received for SSM/Bidir groups: 0/0</pre> |                                                           |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                           |

## show ip pim upstream joins

### show ip pim upstream joins

Displays information about any PIM joins/prunes which are currently being sent to upstream PIM routers

|                           |                                                                                                                                                                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # show ip pim upstream joins Neighbor address: 159.135.45.26 via interface: 159.135.45.34 next message in 43 seconds       Group: 224.0.10.0             Joins:                   22.74.49.25             Prunes:                   No prunes included  switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               | Should contain the following information: neighbor address, interface address, group range, Joins, Prunes.                                                                                                                                                                                           |

## 6.6.5.2 Multicast

### ip multicast-routing

**ip multicast-routing**  
**no ip multicast-routing**

Allows the switch to forward multicast packets.  
The no form of the command disables multicast routing.

|                           |                                       |
|---------------------------|---------------------------------------|
| <b>Syntax Description</b> | N/A                                   |
| <b>Default</b>            | Disabled                              |
| <b>Configuration Mode</b> | Config                                |
| <b>History</b>            | 3.3.5006                              |
| <b>Role</b>               | admin                                 |
| <b>Example</b>            | switch (config)# ip multicast-routing |
| <b>Related Commands</b>   | N/A                                   |
| <b>Note</b>               |                                       |

## ip mroute

**ip mroute** {<ip-addr> <ip-mask> <next-hop>} [pref]  
**no ip mroute** {<ip-addr> <ip-mask>}

Configure multicast reverse path forwarding (RPF) static routes.  
 The no form of the command deletes the static multicast route.

|                           |                                                                                 |                                                                     |
|---------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | ip-addr                                                                         | Unicast IP address.                                                 |
|                           | ip-mask                                                                         | Network mask in a dotted format (e.g. 255.255.255.0) or /24 format. |
|                           | next-hop                                                                        | Next hop IP address.                                                |
|                           | preference                                                                      | Route preference. Range: 1-255.                                     |
| <b>Default</b>            | Preference is 1                                                                 |                                                                     |
| <b>Configuration Mode</b> | Config                                                                          |                                                                     |
| <b>History</b>            | 3.3.5006                                                                        |                                                                     |
| <b>Role</b>               | admin                                                                           |                                                                     |
| <b>Example</b>            | arc-switch14 [standalone: master] (config) # ip mroute 16.16.0.0 /16<br>3.3.3.1 |                                                                     |
| <b>Related Commands</b>   | N/A                                                                             |                                                                     |
| <b>Note</b>               |                                                                                 |                                                                     |



## ip multicast ttl-threshold

**ip multicast ttl-threshold <ttl-value>**

**no ip multicast ttl-threshold**

Configures the time-to-live (TTL) threshold of packets being forwarded out of an interface.

The no form of the command removes RPF static routes.

|                           |                                                                                                                                             |               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Syntax Description</b> | ttl-value                                                                                                                                   | Range: 0-225. |
| <b>Default</b>            | 0 – all packets are forwarded                                                                                                               |               |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |               |
| <b>History</b>            | 3.3.5006                                                                                                                                    |               |
| <b>Role</b>               | admin                                                                                                                                       |               |
| <b>Example</b>            | switch (config interface vlan 10)# ip multicast ttl-threshold 10                                                                            |               |
| <b>Related Commands</b>   | N/A                                                                                                                                         |               |
| <b>Note</b>               |                                                                                                                                             |               |

## show ip mroute

**show ip mroute [summary | <group> [<prefix> [<source>]]]**

Displays information about IPv4 multicast routes.

|                           |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | source                                                                                                                                                                                                                                                                                                                                                                      | Source IP address.                                                                      |
|                           | group                                                                                                                                                                                                                                                                                                                                                                       | IP address of multicast group.                                                          |
|                           | prefix                                                                                                                                                                                                                                                                                                                                                                      | Network prefix of multicast group (in the format of /24, or 255.255.255.0 for example). |
|                           | summary                                                                                                                                                                                                                                                                                                                                                                     | Displays a summary of the multicast routes.                                             |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                         |                                                                                         |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                            |                                                                                         |
| <b>History</b>            | 3.2.1000                                                                                                                                                                                                                                                                                                                                                                    |                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                       |                                                                                         |
| <b>Example</b>            | <pre>arc-switch14 [standalone: master] (config) # show ip mroute IP Multicast Routing Table Flags: B - Bidir Group, L - Local, P - Pruned, R - RP-bit set, T - SPT- bit set       J - Join SPT Timers: Uptime/Expires Interface state: Interface, State/Mode  (*, 225.0.0.0/24), 00D 00:14:49, RP 18.18.18.14, flags: BR Bidir-Upstream: Lo7 Outgoing interface list:</pre> |                                                                                         |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                         |                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                         |

### 6.6.5.3 IGMP

## ip igmp immediate-leave

**ip igmp immediate-leave**  
**no ip igmp immediate-leave**

Enables the device to remove the group entry from the multicast routing table immediately upon receiving a leave message for the group.  
The no form of the command disables immediate-leave.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | Disabled                                                                                                                                    |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.5006                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp immediate-leave                                                                                  |
| <b>Related Commands</b>   | N/A                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                             |

## ip igmp last-member-query-count

**ip igmp last-member-query-count <count>**

**no ip igmp last-member-query-count**

Configures the number of query messages the switch sends in response to a group-specific or group-source-specific leave message.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Syntax Description</b> | Count                                                                                                                                       | Range:1-7. |
| <b>Default</b>            | 2                                                                                                                                           |            |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |            |
| <b>History</b>            | 3.3.5006                                                                                                                                    |            |
| <b>Role</b>               | admin                                                                                                                                       |            |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp last-member-query-count 7                                                                        |            |
| <b>Related Commands</b>   | N/A                                                                                                                                         |            |
| <b>Note</b>               | This parameter reflects expected packet loss on a congested network.                                                                        |            |

## ip igmp last-member-query-response-time

**ip igmp last-member-query-response-time <interval>**  
**no ip igmp last-member-query-response-time**

Configures the IGMP last member query response time in seconds.  
 The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                                                              |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | interval                                                                                                                                    | IGMP last member query response time.<br>Range:1-25 seconds. |
| <b>Default</b>            | 1                                                                                                                                           |                                                              |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                              |
| <b>History</b>            | 3.3.5006                                                                                                                                    |                                                              |
| <b>Role</b>               | admin                                                                                                                                       |                                                              |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp last-member-query-response-time 10                                                               |                                                              |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                              |
| <b>Note</b>               |                                                                                                                                             |                                                              |

## ip igmp startup-query-count

**ip igmp startup-query-count <count>**

**no ip startup-query-count**

Configures the number of query messages an interface sends during startup.  
The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Syntax Description</b> | count                                                                                                                                       | Range: 1-65535. |
| <b>Default</b>            | 2                                                                                                                                           |                 |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                 |
| <b>History</b>            | 3.3.5006                                                                                                                                    |                 |
| <b>Role</b>               | admin                                                                                                                                       |                 |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp startup-query-count 10                                                                           |                 |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                 |
| <b>Note</b>               |                                                                                                                                             |                 |

## ip igmp startup-query-interval

**ip igmp startup-query-interval <interval>**

**no ip startup-query-interval**

Configures the IGMP startup query interval in seconds.  
The no form of the command resets this parameter to its default.

|                           |                                                                                                                                             |                        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>Syntax Description</b> | interval                                                                                                                                    | Range: 1-1800 seconds. |
| <b>Default</b>            | 30                                                                                                                                          |                        |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                        |
| <b>History</b>            | 3.3.5006                                                                                                                                    |                        |
| <b>Role</b>               | admin                                                                                                                                       |                        |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp startup-query-interval 10                                                                        |                        |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                        |
| <b>Note</b>               |                                                                                                                                             |                        |

## ip igmp query-interval

**ip igmp query-interval <interval>**  
**no ip igmp query-interval**

Configures the IGMP query interval in seconds.  
 The no form of the command resets this parameter to its default.

|                           |                                                              |                                                 |
|---------------------------|--------------------------------------------------------------|-------------------------------------------------|
| <b>Syntax Description</b> | interval                                                     | The IGMP query interval. Range: 1-1800 seconds. |
| <b>Default</b>            | 125                                                          |                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN                                        |                                                 |
| <b>History</b>            | 3.3.5006                                                     |                                                 |
| <b>Role</b>               | admin                                                        |                                                 |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp query-interval 60 |                                                 |
| <b>Related Commands</b>   | N/A                                                          |                                                 |
| <b>Note</b>               |                                                              |                                                 |



## ip igmp query-max-response-time

**ip igmp query-max-response-time <time>**

**no ip igmp query-max-response-time**

Configures the IGMP max response time in seconds.

The no form of the command resets this parameter to its default.

|                           |                                                                       |                                                  |
|---------------------------|-----------------------------------------------------------------------|--------------------------------------------------|
| <b>Syntax Description</b> | time                                                                  | The IGMP max response time. Range: 1-25 seconds. |
| <b>Default</b>            | 10                                                                    |                                                  |
| <b>Configuration Mode</b> | Config Interface VLAN                                                 |                                                  |
| <b>History</b>            | 3.3.5006                                                              |                                                  |
| <b>Role</b>               | admin                                                                 |                                                  |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp query-max-response-time 20 |                                                  |
| <b>Related Commands</b>   | N/A                                                                   |                                                  |
| <b>Note</b>               |                                                                       |                                                  |

## ip igmp robustness-variable

**ip igmp robustness-variable <count>**

**no ip igmp robustness-variable**

Configures the IGMP robustness variable.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                                                                                                                   |                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Syntax Description</b> | count                                                                                                                                                                                                                             | IGMP robustness variable. Range: 1-7. |
| <b>Default</b>            | 2                                                                                                                                                                                                                                 |                                       |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port                                                                                       |                                       |
| <b>History</b>            | 3.3.5006                                                                                                                                                                                                                          |                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                             |                                       |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp robustness-variable 4                                                                                                                                                                  |                                       |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                               |                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The robustness variable can be increased to increase the number of times that packets are resent.</li> <li>This parameter reflects expected packet loss on a congested network.</li> </ul> |                                       |

## ip igmp static-oif

**ip igmp static-oif <group>**

**no ip igmp static-oif**

Statically binds an IP interface to a multicast group.

The no form of the command deletes the static multicast address from the interface.

|                           |                                                                                                                                             |                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | group                                                                                                                                       | Multicast IP address. |
| <b>Default</b>            | no ip igmp static-oif                                                                                                                       |                       |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                       |
| <b>History</b>            | 3.3.5006                                                                                                                                    |                       |
| <b>Role</b>               | admin                                                                                                                                       |                       |
| <b>Example</b>            | switch (config interface vlan 10)# ip igmp static-oif 10.10.10.5                                                                            |                       |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                       |
| <b>Note</b>               | PIM must be enabled in order to configure the route in the hardware.                                                                        |                       |

## clear ip igmp groups

**clear ip igmp groups {all | <group-address> <mask>}**

Clears IGMP group information.

|                           |                                                               |                          |
|---------------------------|---------------------------------------------------------------|--------------------------|
| <b>Syntax Description</b> | all                                                           | Clears all IGMP groups.  |
|                           | group-address                                                 | Clears a specific group. |
| <b>Default</b>            | no ip igmp static-oif                                         |                          |
| <b>Configuration Mode</b> | Config                                                        |                          |
| <b>History</b>            | 3.3.5200                                                      |                          |
| <b>Role</b>               | admin                                                         |                          |
| <b>Example</b>            | switch (config)# clear ip igmp groups all<br>switch (config)# |                          |
| <b>Related Commands</b>   | N/A                                                           |                          |
| <b>Note</b>               |                                                               |                          |

## debug ethernet ip igmp-l3

**debug ethernet ip igmp-l3 {all | control-plane | data-path | fail-all | init-shut | management | memory | packet-dump | resources}**  
**no debug ethernet ip igmp-l3 {all | control-plane | data-path | fail-all | init-shut | management | memory | packet-dump | resources}**

Configures the trace level for IGMP.

The no form of the command removes the trace level for IGMP.

|                           |                                                |                                                 |
|---------------------------|------------------------------------------------|-------------------------------------------------|
| <b>Syntax Description</b> | all                                            | Enable track traces.                            |
|                           | control-plane                                  | Control plane traces.                           |
|                           | data-path                                      | IP packet dump trace.                           |
|                           | fail-all                                       | All failures including Packet Validation Trace. |
|                           | init-shut                                      | Init and shutdown messages.                     |
|                           | management                                     | Management messages.                            |
|                           | memory                                         | Memory related messages.                        |
|                           | packet-dump                                    | Packet dump messages.                           |
|                           | resources                                      | OS Resource trace.                              |
| <b>Default</b>            | N/A                                            |                                                 |
| <b>Configuration Mode</b> | Config                                         |                                                 |
| <b>History</b>            | 3.3.5200                                       |                                                 |
| <b>Role</b>               | admin                                          |                                                 |
| <b>Example</b>            | switch (config)# debug ethernet ip igmp-l3 all |                                                 |
| <b>Related Commands</b>   |                                                |                                                 |
| <b>Note</b>               |                                                |                                                 |

## show ip igmp groups

**show ip igmp groups [<group>] [vlan <vlan-id>]**

Displays information about IGMP-attached group membership.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | group                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Filters the output to a specific IP multicast group address. |
|                           | vlan <vlan-id>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Filters the output to a specific VLAN ID.                    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                              |
| <b>History</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <b>Example</b>            | <pre>switch (config)# show ip igmp groups IGMP Connected Group Membership for VRF "default" Type: S - Static, D - Dynamic, L - Local, T - SSM Translated  Group Address Type Interface Uptime Expires Last Reporter 225.7.6.0 S vlan19 [0d 00:12:12.14] [0d 00:00:00.00] 0.0.0.0 225.7.10.1 D vlan19 [0d 00:00:01.18] [0d 00:04:08.81] 19.19.19.1 225.7.7.7 S vlan19 [0d 00:12:12.15] [0d 00:00:00.00] 0.0.0.0 225.7.7.7 S vlan21 [0d 00:12:12.15] [0d 00:00:00.00] 0.0.0.0</pre> |                                                              |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |

# show ip igmp interface

**show ip igmp interface [vlan <vlan-id> | brief]**

Displays IGMP brief configuration and status.

|                           |                  |                                           |
|---------------------------|------------------|-------------------------------------------|
| <b>Syntax Description</b> | brief            | Displays brief output information.        |
|                           | vlan <vlan-id>   | Filters the output to a specific VLAN ID. |
| <b>Default</b>            | N/A              |                                           |
| <b>Configuration Mode</b> | Any Command Mode |                                           |
| <b>History</b>            |                  |                                           |
| <b>Role</b>               | admin            |                                           |

**Example**

```

switch(config)#show ip igmp interface
IGMP Interfaces for VRF "default"

VLAN5
Interface status: protocol-down/admin-up/link-down
IP address: 5.5.5.49, IP Subnet: 5.5.5.0/24
Active Querier: 5.5.5.48
Membership count: 0
Route-queue depth: 0
IGMP Version: 2
IGMP query interval: 125 secs, configured value: 125 secs
IGMP max response time: 100 secs, configured value: 100 secs
IGMP startup query interval: 125 secs, configured value: 125 secs
IGMP startup query count: 2
IGMP group timeout: 350 secs, configured value: 350 secs
IGMP querier timeout: 350 secs configured value: 350 secs
IGMP last member mrt: 10 secs configured value: 10
IGMP robustness variable: 2
IGMP interface immediate leave: Disabled
IGMP interface statistics:
General (sent/received):
v1/v2-reports: 0/0
v2-queries: 3/1,v2-leaves: 0/0
v3-queries: 0/0,
v3-reports: 0/0

VLAN19
Interface status: protocol-up/admin-up/link-up
IP address: 19.19.19.49, IP Subnet: 19.19.19.0/24
Active Querier: 19.19.19.49
Membership count: 3
Route-queue depth: 0
IGMP Version: 2
IGMP query interval: 125 secs, configured value: 125 secs
IGMP max response time: 10 secs, configured value: 10 secs
IGMP startup query interval: 125 secs, configured value: 125 secs
IGMP startup query count: 2
IGMP group timeout: 260 secs, configured value: 260 secs
IGMP querier timeout: 260 secs configured value: 260 secs
IGMP last member mrt: 1 secs configured value: 1
IGMP robustness variable: 2
IGMP interface immediate leave: Disabled
IGMP interface statistics:
General (sent/received):
v1/v2-reports: 0/5
v2-queries: 14/0,v2-leaves: 0/1
v3-queries: 0/0,
v3-reports: 0/0

```

**Related Commands**

N/A

**Note**



## 6.7 VRRP

The Virtual Router Redundancy Protocol (VRRP) is a computer networking protocol that provides for automatic assignment of available IP routers to participating hosts. This increases the availability and reliability of routing paths via automatic default gateway selections on an IP sub-network.

The protocol achieves this by creating virtual routers, which are an abstract representation of multiple routers (that is, a master and backup routers, acting as a group). The default gateway of a participating host is assigned to the virtual router instead of a physical router. If the physical router that is routing packets on behalf of the virtual router fails, another physical router is selected to automatically replace it. The physical router that is forwarding packets at any given time is called the master router.

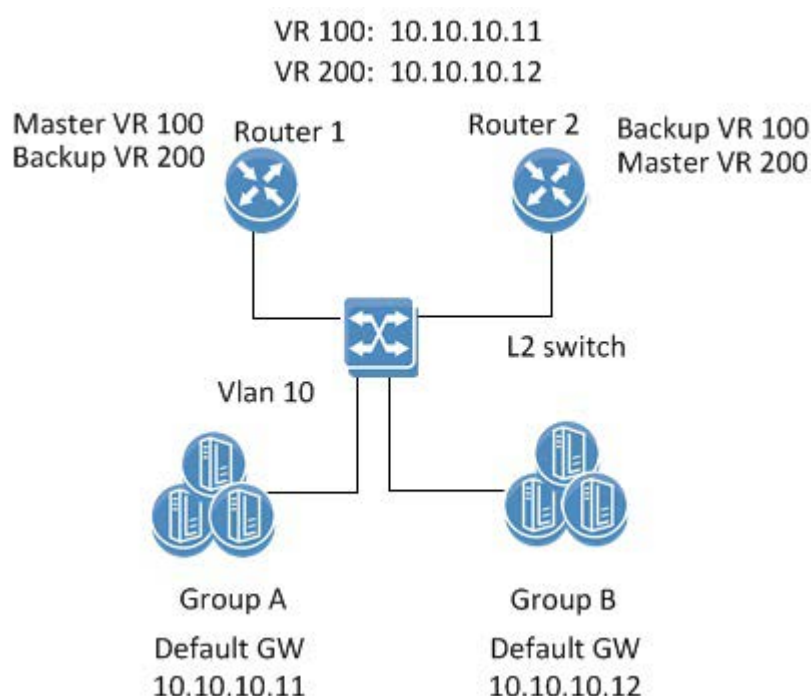
VRRP provides information on the state of a router, not the routes processed and exchanged by that router. Each VRRP instance is limited, in scope, to a single subnet. It does not advertise IP routes beyond that subnet or affect the routing table in any way.

Routers have a priority of between 1-255 and the router with the highest priority becomes the master. The configurable priority value ranges from 1-254, the router which owns the interface IP address has the priority value 255. When a planned withdrawal of a master router is to take place, its priority can be lowered, which means a backup router will preempt the master router status rather than having to wait for the hold time to expire.

### 6.7.1 Load Balancing

To create load balancing between routers participating in the same VR, it is recommended to create 2 (or more) VRs. Each router will be a master in one of the VRs, and a backup to the other VR(s). A group of hosts should be configured with Router 1's virtual address as the default gateway, while the second group should be configured with Router 2's virtual address.

**Figure 35: Common VRRP Configuration with Load Balancing**



## 6.7.2 Configuring VRRP

### ➤ To configure VRRP:

Precondition steps:

**Step 1.** Enable IP routing functionality. Run:

```
switch (config)# ip routing
```

**Step 2.** Enable the desired VLAN. Run:

```
switch (config)# vlan 20
```



The VLAN cannot be the same one configured for the MLAG IPL, if MLAG is used.

**Step 3.** Add this VLAN to the desired interface. Run:

```
switch (config)# interface ethernet 1/1
switch (config ethernet 1/1)# switchport access vlan 20
```

**Step 4.** Create a VLAN interface. Run:

```
switch (config)# interface vlan 20
```

**Step 5.** Apply IP address to the VLAN interface.

On one of the switches, run:

```
switch (config interface vlan 20)# ip address 20.20.20.20 /24
```

On the other switch, run:

```
switch (config interface vlan 20)# ip address 20.20.20.30 /24
```

**Step 6.** Enable the interface. Run:

```
switch (config interface vlan 20)# no shutdown
```

Configure VRRP:

This is the same configuration on both switches

**Step 1.** Enable VRRP protocol globally. Run:

```
switch (config)# protocol vrrp
```

**Step 2.** Create a virtual router group for an IP interface. Up to 255 VRRP IDs are supported. Run:

```
switch (config interface vlan 20)# vrrp 100
```

**Step 3.** Set the VIP address. Run:

```
switch (config interface vlan 20 vrrp 100)# address 20.20.20.40
```

**Step 4.** Influence the election of the master in the VR cluster make sure that the priority of the desired master is the highest. Note that the higher IP address is selected in case the priority of the routers in the VR are the same. Select the priority. Run:

```
switch (config interface vlan 20 vrrp 100)# priority 200
```

**Step 5.** The advertisement interval should be the same for all the routers within the VR. Modify the interval. Run:

```
switch (config interface vlan 20 vrrp 100)# advertisement-interval 2
```

**Step 6.** The authentication text should be the same for all the routers within the VR. Configure the authentication text. Run:

```
switch (config interface vlan 20 vrrp 100)# authentication text my-password
```

**Step 7.** Use the preempt command to enable a high-priority backup virtual router to preempt the low-priority master virtual router. Run:

```
switch (config interface vlan 20 vrrp 100)# preempt
```

**Step 8.** Disable VRRP. Run:

```
switch (config interface vlan 20 vrrp 100)# shutdown
```



The configuration will not be deleted, only the VRRP state machine will be stopped.

### 6.7.3 Verifying VRRP

**Step 1.** Display VRRP brief status. Run:

```
switch(config)# show vrrp
Interface VR Pri Time Pre State VR IP addr

Vlan20 1 200 2s Y Init 20.20.20.20
...
switch(config)#
```

**Step 2.** Display VRRP detailed status. Run:

```
switch (config)# show vrrp detail

VRRP Admin State : Enabled

Vlan20 - Group 1 (IPv4)

Instance Admin State : Enabled
State : Backup
Virtual IP Address : 20.20.20.40
Priority : 200
Advertisement interval (sec) : 2
Preemption : Enabled
Virtual MAC address : AA:BB:CC:DD:EE:FF
switch (config)#
```

**Step 3.** Display VRRP statistic counters. Run:

```
switch (config)# show vrrp statistics
Ethernet1/5 - Group 1 (IPv4)
Invalid packets: 0
Too short: 0
Transitions to Master 6
Total received: 155
Bad TTL: 0
Failed authentication: 0
Unknown authentication: 0
Conflicting authentication: 0
Conflicting Advertise time: 0
Conflicting Addresses: 0
Received with zero priority: 3
Sent with zero priority: 3
switch (config)#
```

## 6.7.4 Commands

### protocol vrrp

**protocol vrrp**  
**no protocol vrrp**

Enables VRRP globally and unhides VRRP related commands.  
The no form of the command deletes all the VRRP configuration and hides VRRP related commands.

|                           |                                |
|---------------------------|--------------------------------|
| <b>Syntax Description</b> | N/A                            |
| <b>Default</b>            | no feature vrrp                |
| <b>Configuration Mode</b> | Config                         |
| <b>History</b>            | 3.3.4500                       |
| <b>Role</b>               | admin                          |
| <b>Example</b>            | switch (config)# protocol vrrp |
| <b>Related Commands</b>   |                                |
| <b>Note</b>               |                                |

## vrrp

**vrrp <number>**  
**no vrrp <number>**

Creates a virtual router group on this interface and enters a new configuration mode. The no form of the command deletes the VRRP instance and the related configuration.

|                           |                                                                                  |                                         |
|---------------------------|----------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | number                                                                           | A VRRP instance number. Range is 1-255. |
| <b>Default</b>            | N/A                                                                              |                                         |
| <b>Configuration Mode</b> | Config Interface VLAN                                                            |                                         |
| <b>History</b>            | 3.3.4500                                                                         |                                         |
| <b>Role</b>               | admin                                                                            |                                         |
| <b>Example</b>            | switch (config interface vlan 10)#<br>switch (config interface vlan 10 vrrp 10)# |                                         |
| <b>Related Commands</b>   |                                                                                  |                                         |
| <b>Note</b>               | Maximum of 10 VRRP instances are supported.                                      |                                         |

## address

**address** <ip-address> [secondary]  
**no address** [<ip-address> [secondary]]

Sets virtual router IP address (primary and secondary).  
 The no form of the command deletes the IP address from the VRRP interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The virtual IP address.                        |
|                           | secondary                                                                                                                                                                                                                                                                                                                                                                                                                                                         | A secondary IP address for the virtual router. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                |
| <b>Configuration Mode</b> | Config VRRP Interface                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                |
| <b>Example</b>            | switch (config vrrp 100)# address 10.10.10.10<br>switch (config vrrp 100)# address 10.10.10.11 secondary<br>switch (config vrrp 100)# address 10.10.10.12 secondary                                                                                                                                                                                                                                                                                               |                                                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                |
| <b>Note</b>               | <ul style="list-style-type: none"><li>• This command is the enabler of the protocol. Therefore, set all the protocol parameters initially and only then set the ip-address.</li><li>• There are up to 10 IP addresses associated with the VRRP instance. One primary and up to 10 secondary ip-addresses.</li><li>• If the configured IP address is the same as the interface IP address, this switch automatically owns the IP address (priority 255).</li></ul> |                                                |

## shutdown

**shutdown**  
**no shutdown**

Disables the virtual router.  
The no form of the command enables the virtual router (stops the VRRP state machine).

|                           |                                    |
|---------------------------|------------------------------------|
| <b>Syntax Description</b> | N/A                                |
| <b>Default</b>            | Enabled (no shutdown)              |
| <b>Configuration Mode</b> | Config VRRP Interface              |
| <b>History</b>            | 3.3.4500                           |
| <b>Role</b>               | admin                              |
| <b>Example</b>            | switch (config vrrp 100)# shutdown |
| <b>Related Commands</b>   |                                    |
| <b>Note</b>               |                                    |



## priority

**priority <level>**

**no priority**

Sets the priority of the virtual router.

The no form of the command resets the priority to its default.

|                           |                                                                                                                                                                                                                                                                                                     |                                                    |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Syntax Description</b> | level                                                                                                                                                                                                                                                                                               | The virtual router priority level. Range is 1-254. |
| <b>Default</b>            | 100                                                                                                                                                                                                                                                                                                 |                                                    |
| <b>Configuration Mode</b> | Config VRRP Interface                                                                                                                                                                                                                                                                               |                                                    |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                            |                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                               |                                                    |
| <b>Example</b>            | switch (config vrrp 100)# priority 200                                                                                                                                                                                                                                                              |                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                     |                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The higher IP address will be selected as master, in case the priority of the routers in the VR are the same.</li> <li>To influence the election of the master in the VR cluster make sure that the priority of the desired master is the higher.</li> </ul> |                                                    |

## preempt

**preempt**  
**no preempt**

Sets virtual router preemption mode.  
The no form of the command disables the virtual router preemption.

|                           |                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                          |
| <b>Default</b>            | Enabled (preempt)                                                                            |
| <b>Configuration Mode</b> | Config VRRP Interface                                                                        |
| <b>History</b>            | 3.3.4500                                                                                     |
| <b>Role</b>               | admin                                                                                        |
| <b>Example</b>            | switch (config vrrp 100)# preempt                                                            |
| <b>Related Commands</b>   |                                                                                              |
| <b>Note</b>               | To set this router as backup for the current virtual router master, preempt must be enabled. |

## authentication text

**authentication text <password>**

**no authentication text**

Sets virtual router authentication password and enables authentication.  
The no form of the command disables the authentication mechanism.

|                           |                                                          |                                                                                                          |
|---------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | password                                                 | The virtual router authentication password. The password string must be up to 8 alphanumeric characters. |
| <b>Default</b>            | Disabled                                                 |                                                                                                          |
| <b>Configuration Mode</b> | Config VRRP Interface                                    |                                                                                                          |
| <b>History</b>            | 3.3.4500                                                 |                                                                                                          |
| <b>Role</b>               | admin                                                    |                                                                                                          |
| <b>Example</b>            | switch (config vrrp 100)# authentication text mypassword |                                                                                                          |
| <b>Related Commands</b>   |                                                          |                                                                                                          |
| <b>Note</b>               |                                                          |                                                                                                          |

## advertisement-interval

**advertisement-interval <seconds>**  
**no advertisement-interval**

Sets the virtual router advertisement-interval.  
 The no form of the command resets the parameter to its default.

|                           |                                                     |                                                                        |
|---------------------------|-----------------------------------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | seconds                                             | The virtual router advertisement-interval in seconds.<br>Range: 1-255. |
| <b>Default</b>            | 1                                                   |                                                                        |
| <b>Configuration Mode</b> | Config VRRP Interface                               |                                                                        |
| <b>History</b>            | 3.3.4500                                            |                                                                        |
| <b>Role</b>               | admin                                               |                                                                        |
| <b>Example</b>            | switch (config vrrp 100)# advertisement-interval 10 |                                                                        |
| <b>Related Commands</b>   |                                                     |                                                                        |
| <b>Note</b>               |                                                     |                                                                        |

## show vrrp

**show vrrp [interface <type> <number>] [vr <id>]**

Displays VRRP brief configuration and status.

|                           |                                                                                                                                                             |                                                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | interface <type> <number>                                                                                                                                   | Filters the output to a specific interface type and number.      |
|                           | vr <id>                                                                                                                                                     | Filters the output to a specific virtual router.<br>Range: 1-10. |
| <b>Default</b>            | N/A                                                                                                                                                         |                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                            |                                                                  |
| <b>History</b>            | 3.3.4500                                                                                                                                                    |                                                                  |
| <b>Role</b>               | admin                                                                                                                                                       |                                                                  |
| <b>Example</b>            | <pre>switch(config)# show vrrp Interface  VR Pri Time  Pre  State VR  IP addr ----- Eth1/5    1  200  2s   Y    Init   192.0.1.10 ... switch(config)#</pre> |                                                                  |
| <b>Related Commands</b>   |                                                                                                                                                             |                                                                  |
| <b>Note</b>               |                                                                                                                                                             |                                                                  |

## show vrrp detail

**show vrrp detail [interface <type> <number>] [vr <id>]**

Displays detailed VRRP configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                 |                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | interface <type> <number>                                                                                                                                                                                                                                                                                       | Filters the output to a specific interface type and number.       |
|                           | vr <id>                                                                                                                                                                                                                                                                                                         | Filters the output to a specific virtual router.<br>Range: 1-255. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                             |                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                |                                                                   |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                        |                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                           |                                                                   |
| <b>Example</b>            | <pre>switch (config)# show vrrp detail  VRRP Admin State : Enabled  Vlan20 - Group 1 (IPv4)  Instance Admin State : Enabled State : Backup Virtual IP Address : 20.20.20.40 Priority : 200 Advertisement interval (sec) : 2 Preemption : Enabled Virtual MAC address : AA:BB:CC:DD:EE:FF switch (config)#</pre> |                                                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                 |                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                 |                                                                   |

## show vrrp statistics

**show vrrp statistics** [interface <type> <number>] [vr <id>]

Displays VRRP counters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | interface <type> <number>                                                                                                                                                                                                                                                                                                                                                                                                                                        | Filters the output to a specific interface type and number.       |
|                           | vr <id>                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Filters the output to a specific virtual router.<br>Range: 1-255. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                   |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |
| <b>Example</b>            | <pre>switch (config)# show vrrp statistics Ethernet1/5 - Group 1 (IPv4) Invalid packets:           0 Too short:                 0 Transitions to Master      6 Total received:            155 Bad TTL:                   0 Failed authentication:     0 Unknown authentication:    0 Conflicting authentication: 0 Conflicting Advertise time: 0 Conflicting Addresses:     0 Received with zero priority: 3 Sent with zero priority:   3 switch (config)#</pre> |                                                                   |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |

## 6.8 MAGP

Multi-active gateway protocol (MAGP) is aimed to solve the default gateway problem when a host is connected to a set of switch routers (SRs) via MLAG.

The network functionality in that case requires that each SR is an active default gateway router to the host, thus reducing hops between the SRs and directly forwarding IP traffic to the L3 cloud regardless which SR traffic comes through.



Designated traffic, such as ping to the MAGP interface is not supported. One of the two switches will be able to ping, so a ping from one switch can be done.

### 6.8.1 MAGP Configuration

Prerequisite steps:

**Step 1.** Enable IP routing functionality. Run:

```
switch (config)# ip routing
```

**Step 2.** Enable the desired VLAN. Run:

```
switch (config)# vlan 20
switch (config vlan 20)#
```



The VLAN cannot be the same one configured for the MLAG IPL, if MLAG is used.

**Step 3.** Add this VLAN to the desired interface. Run:

```
switch (config)# interface ethernet 1/1
switch (config interface ethernet 1/1)# switchport access vlan 20
```

**Step 4.** Create a VLAN interface. Run:

```
switch (config)# interface vlan 20
switch (config interface vlan 20)#
```

**Step 5.** Set an IP address to the VLAN interface. Run:

```
switch (config interface vlan 20)# ip address 11.11.11.11 /8
```

**Step 6.** Enable the interface. Run:

```
switch (config interface vlan 20)# no shutdown
```

#### ➤ **To configure MAGP:**

**Step 1.** Enable MAGP protocol globally. Run:

```
switch (config)# protocol magp
```

**Step 2.** Create a virtual router group for an IP interface. Run:

```
switch (config interface vlan 20)# magp 100
```





Up to 255 MAGP IDs are supported.

**Step 3.** Set a virtual router primary IP address. Run:

```
switch (config interface vlan 20 magp 100)# ip virtual-router address 11.11.11.254
```



The IP address must be in the same subnet of the VLAN interface. This IP address is the default gateway for this MAGP instance. This should become the default gateway configured on the hosts connected to the relevant MLAG.

**Step 4.** Set a virtual router primary MAC address. Run:

```
switch (config interface vlan 20 magp 100)# ip virtual-router mac-address
AA:BB:CC:DD:EE:FF
```

➤ **To verify the MAGP configuration, run:**

```
switch (config)# show magp 1
MAGP 1
 Interface vlan:1
 MAGP state:Master
 MAGP virtual IP: 11.11.11.254
 MAGP virtual MAC: AA:BB:CC:DD:EE:FF
switch (config)#
```



This output is to be expected in both MAGP switches.

## 6.8.2 Commands

### protocol magp

**protocol magp**  
**no protocol magp**

Enables MAGP globally and unhides MAGP commands.  
The no form of the command deletes all the MAGP configuration and hides MAGP commands.

|                           |                                                    |
|---------------------------|----------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                |
| <b>Default</b>            | Disabled                                           |
| <b>Configuration Mode</b> | Config                                             |
| <b>History</b>            | 3.3.4500                                           |
| <b>Role</b>               | admin                                              |
| <b>Example</b>            | switch (config)# protocol magp<br>switch (config)# |
| <b>Related Commands</b>   |                                                    |
| <b>Note</b>               | IP routing must be enabled to enable MAGP.         |

## magp

**magp <instance>**  
**no magp <instance>**

Creates an MAGP instance on this interface and enters a new configuration mode.  
 The no form of the command deletes the MAGP instance.

|                           |                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | instance<br>MAGP instance number. Range: 1-255.                                                                                                                                                                         |
| <b>Default</b>            | Disabled                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config Interface VLAN                                                                                                                                                                                                   |
| <b>History</b>            | 3.3.4500                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                   |
| <b>Example</b>            | switch (config interface vlan 10)# magp 1<br>switch (config interface vlan 10 magp 1)#                                                                                                                                  |
| <b>Related Commands</b>   |                                                                                                                                                                                                                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Only one MAGP instance can be created on an interface</li> <li>• Different interfaces cannot share an MAGP instance</li> <li>• MAGP and VRRP are mutually exclusive</li> </ul> |

## shutdown

**shutdown**  
**no shutdown**

Enables MAGP instance.  
 The no form of the command disables the MAGP instance.

|                           |                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                  |
| <b>Default</b>            | Disabled                                                                                             |
| <b>Configuration Mode</b> | Config Interface VLAN MAGP                                                                           |
| <b>History</b>            | 3.3.4500                                                                                             |
| <b>Role</b>               | admin                                                                                                |
| <b>Example</b>            | switch (config interface vlan 10 magp 1)# protocol magp<br>switch (config interface vlan 10 magp 1)# |
| <b>Related Commands</b>   |                                                                                                      |
| <b>Note</b>               |                                                                                                      |

## ip virtual-router address

**ip virtual-router address <ip-address>**

**no ip virtual-router address**

Sets MAGP virtual IP address.

The no form of the command resets this parameter to its default.

|                           |                                                                                                                                      |                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                           | The virtual router IP address. |
| <b>Default</b>            | N/A                                                                                                                                  |                                |
| <b>Configuration Mode</b> | Config Interface VLAN MAGP                                                                                                           |                                |
| <b>History</b>            | 3.3.4500                                                                                                                             |                                |
| <b>Role</b>               | admin                                                                                                                                |                                |
| <b>Example</b>            | <pre>switch (config interface vlan 10 magp 1)# ip virtual-router address 10.10.10.10 switch (config interface vlan 10 magp 1)#</pre> |                                |
| <b>Related Commands</b>   |                                                                                                                                      |                                |
| <b>Note</b>               | The MAGP virtual IP address must be different from the interface IP address                                                          |                                |

## ip virtual-router mac-address

**ip virtual-router mac-address <mac-address>**

**no ip virtual-router mac-address**

Sets MAGP virtual MAC address.

The no form of the command resets the MAC address to its default.

|                           |                                                                                                                                                |                                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | mac-address                                                                                                                                    | MAC address. Format: AA:BB:CC:DD:EE:FF. |
| <b>Default</b>            | 00:00:5E:00:01-<magp instance>                                                                                                                 |                                         |
| <b>Configuration Mode</b> | Config Interface VLAN MAGP                                                                                                                     |                                         |
| <b>History</b>            | 3.3.4500                                                                                                                                       |                                         |
| <b>Role</b>               | admin                                                                                                                                          |                                         |
| <b>Example</b>            | <pre>switch (config interface vlan 10 magp 1)# ip virtual-router mac-address AA:BB:CC:DD:EE:FF switch (config interface vlan 10 magp 1)#</pre> |                                         |
| <b>Related Commands</b>   |                                                                                                                                                |                                         |
| <b>Note</b>               |                                                                                                                                                |                                         |

## show magp

**show magp [<instance> | interface vlan <id>]**

Displays the configuration of a specific MAGP instance.

|                           |                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | instance<br>MAGP instance number. Range: 1-255.                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                      |
| <b>History</b>            | 3.3.4500                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config)# show magp 3 Magp instance id: 3 Interface : vlan 10 Magp state: Active Magp virtual ip :192.168.1.1 Magp virtual MAC : 00:11:22:22:44:55 switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                                       |

## 6.9 DHCP Relay



DHCP Relay is not supported on SX10xx-xxxR and SX60xx-xxxR systems.

Since Dynamic Host Configuration Protocol must work correctly even before DHCP clients have been configured, the DHCP server and DHCP client need to be connected to the same network.

In larger networks, this is not always practical because each network link contains one or more DHCP relay agents. These DHCP relay agents receive messages from DHCP clients and forward them to DHCP servers thus extending the reach of the DHCP beyond the local network.



## 6.9.1 Commands

### ip dhcp relay address

**ip dhcp relay address <ip-address>**  
**no ip dhcp relay address <ip-address>**

Configures IP address of the DHCP server to forward DHCP requests.  
 The no form of the command deletes the DHCP server IP address.

|                           |                                                                                                                                                                                                                                                               |                                          |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                    | Valid IP unicast address of DHCP server. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                           |                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                        |                                          |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                      |                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                         |                                          |
| <b>Example</b>            | switch (config)# ip dhcp relay address 10.10.10.10<br>switch (config)#                                                                                                                                                                                        |                                          |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                           |                                          |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Up to 16 IP addresses may be configured</li> <li>To enable DHCP relay, at least one IP address should be configured, or always-on parameter should be turned on using the command “ip dhcp relay always-on”</li> </ul> |                                          |

## ip dhcp relay information option

**ip dhcp relay information option**  
**no ip dhcp relay information option**

Enables the DHCP relay agent to insert option 82 info on the packets.  
The no form of the command removes option 82 from the packets.

|                           |                                                                       |
|---------------------------|-----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                   |
| <b>Default</b>            | Disabled                                                              |
| <b>Configuration Mode</b> | Config                                                                |
| <b>History</b>            | 3.3.4150                                                              |
| <b>Role</b>               | admin                                                                 |
| <b>Example</b>            | switch (config)# ip dhcp relay information option<br>switch (config)# |
| <b>Related Commands</b>   | N/A                                                                   |
| <b>Note</b>               |                                                                       |

## ip dhcp relay always-on

**ip dhcp relay always-on**  
**no ip dhcp relay always-on**

Broadcasts DHCP requests to all interfaces with the DHCP relay agent.  
 The no form of the command disables the “always-on” mode.

|                           |                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | Disabled                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | switch (config)# ip dhcp relay always-on<br>switch (config)#                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• In order to enable DHCP relay, at least one IP address should be configured, or always-on parameter should be turned on using the command “ip dhcp relay always-on”</li> <li>• When DHCP servers are configured, requests are forwarded only to configured servers</li> </ul> |

## clear ip dhcp relay counters

### clear ip dhcp relay counters

Clears all DHCP relay counters (all interfaces).

|                           |                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | Disabled                                                                                                                                                                                                                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                                                                               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | switch (config)# clear ip dhcp relay counters<br>switch (config)#                                                                                                                                                                                                                                                      |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• In order to enable DHCP relay, at least one IP address should be configured, or always-on parameter should be turned on using the command “ip dhcp relay always-on”</li> <li>• When DHCP servers are configured. requests are forwarded only to configured servers</li> </ul> |

### 6.9.1.1 Interface

## ip dhcp relay information option circuit-id

**ip dhcp relay information option circuit-id <label>**  
**no ip dhcp relay information option circuit-id**

Specifies the content of tags that the switch attaches to DHCP requests before they are forwarded.

The no form of the command removes the label assigned.

|                           |                                                                                                                                             |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Syntax Description</b> | label                                                                                                                                       | Specifies the label attached to packets. The string may be up to 15 characters. |
| <b>Default</b>            | The label is taken from the IP interface name (e.g. "vlan1")                                                                                |                                                                                 |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |                                                                                 |
| <b>History</b>            | 3.3.4150                                                                                                                                    |                                                                                 |
| <b>Role</b>               | admin                                                                                                                                       |                                                                                 |
| <b>Example</b>            | switch (config interface vlan 10)# ip dhcp relay information options<br>circuit-id my-label<br>switch (config interface vlan 10)#           |                                                                                 |
| <b>Related Commands</b>   | N/A                                                                                                                                         |                                                                                 |
| <b>Note</b>               |                                                                                                                                             |                                                                                 |

## clear ip dhcp relay counters

**ip dhcp relay counters**  
**no ip dhcp relay counters**

Clears all DHCP relay counters on the interface.

|                           |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                         |
| <b>Configuration Mode</b> | Config Interface VLAN<br>Config Interface Ethernet configured as a router port<br>Config Interface Port Channel configured as a router port |
| <b>History</b>            | 3.3.4150                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                       |
| <b>Example</b>            | switch (config interface vlan 10)# clear ip dhcp relay counters<br>switch (config interface vlan 10)#                                       |
| <b>Related Commands</b>   | N/A                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                             |

## 6.9.1.2 Show

### show ip dhcp relay

#### show ip dhcp relay

Displays DHCP relay configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                         |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config)# show ip dhcp relay DHCP servers: 172.22.22.11, 172.33.33.33, ... (or N/A) DHCP clients requests are processed on all interfaces DHCP server responses are processed on all interfaces DHCP relay agent information option is {enabled, disabled} DHCP relay agent always-on is {enabled, disabled} Interface Label ----- Vlan10    my-label switch (config)#</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                          |

## show ip dhcp relay counters

### show ip dhcp relay counters

Displays the DHCP relay counters.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>History</b>            | 3.3.4150                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config)#show ip dhcp relay counters  Interface Received Forwarded Dropped ----- All Req      376          376      0 All Resp     277          277      0 Interface Received Forwarded Dropped Last cleared ----- vlan1000    1000          1000      0          &lt;Date&gt; vlan1020    2000          2000      0          &lt;Date&gt; // &lt;Date&gt; == &lt;DD-MM-YY, Hour-Minutes-Seconds&gt; - something like: "20-07-13, 22:34:36" switch (config)#</pre> |
| <b>Related Commands</b>   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



# 7 InfiniBand Switching

## 7.1 Node Name

### 7.1.1 Commands

#### ib nodename

**ib nodename <guid> name <name>**  
**no ib nodename <guid>**

Maps between GUID and node name.

|                           |                                                                                                                                                                                                        |                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Syntax Description</b> | guid                                                                                                                                                                                                   | The system GUID.     |
|                           | name                                                                                                                                                                                                   | User defined string. |
| <b>Default</b>            | N/A                                                                                                                                                                                                    |                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                 |                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                               |                      |
| <b>Role</b>               | admin                                                                                                                                                                                                  |                      |
| <b>Example</b>            | <pre>switch (config) # ib nodename 00:00:00:00:60:04:03:30 name my-name switch (config) # show ib nodename     GUID='00:00:00:00:60:04:03:30', name='my-name', discovered='no' switch (config) #</pre> |                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                        |                      |
| <b>Note</b>               | If an entry with GUID exists, the existing name will be replaced with a new name.                                                                                                                      |                      |

## show ib nodename

### show ib nodename

Maps between GUID and node name.

|                           |                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                               |
| <b>Default</b>            | N/A                                                                                                                               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # show ib nodename   GUID='00:00:00:00:60:04:03:30', name='my-name', discovered='no' switch (config) #</pre> |
| <b>Related Commands</b>   | ib nodename                                                                                                                       |
| <b>Note</b>               |                                                                                                                                   |

## 7.2 Fabric

### 7.2.1 Commands

#### **fabric zero-counters**

##### **fabric zero-counters**

Clears the performance counters of the node.

|                           |                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                         |
| <b>Default</b>            | N/A                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                    |
| <b>Role</b>               | monitor/admin                                                                               |
| <b>Example</b>            | switch (config) # fabric zero-counters<br>Counters zeroed successfully<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                             |
| <b>Note</b>               |                                                                                             |

## show fabric

### show fabric {pm | sm}

Displays InfiniBand fabric details.

|                           |                                                                                                                                                                                                                                                                                                                       |                                                      |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>Syntax Description</b> | pm                                                                                                                                                                                                                                                                                                                    | Displays InfiniBand fabric performance measurements. |
|                           | sm                                                                                                                                                                                                                                                                                                                    | Displays InfiniBand fabric SMs.                      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                   |                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                |                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                              | First version                                        |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                              | Added note                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                 |                                                      |
| <b>Example</b>            | <pre>switch (config) # show fabric sm % # This database file was automatically generated by IBDIAG  ibdiagnet fabric SM report  SM - master   Port=0 lid=0x0005 guid=0x0002c903004a2980 dev=51000 priority:15  SM - standby   Port=0 lid=0x0001 guid=0x00000000000000111 dev=51000 priority:0 switch (config) #</pre> |                                                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                       |                                                      |
| <b>Note</b>               | This command requires a fabric inspector license (LIC-fabric-inspector).                                                                                                                                                                                                                                              |                                                      |

## show {guids | system guid}

**show {guids | system guid}**

Displays GUIDs per asic in the chassis, or show only the system guid.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # show guids ===== SX module                                GUID ===== SYSTEM                                00:02:C9:03:00:43:D9:00 S01                                  00:02:C9:03:00:5C:38:A0 L30                                  00:02:C9:03:00:5C:4B:00 S02                                  00:02:C9:03:00:49:69:80 L01                                  00:02:C9:03:00:49:C2:C0 L02                                  00:02:C9:03:00:49:AF:C0 switch (config) #show system guid 00:02:C9:03:00:43:D9:00 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## show lids

### show lids

Displays the Lids of each module in the switch system

|                           |                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                               |
| <b>Default</b>            | N/A                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                          |
| <b>Role</b>               | admin/monitor                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show lids ===== SX module          lid ===== 1                  10 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                   |
| <b>Note</b>               |                                                                                                                   |

## 7.3 Interface

### 7.3.1 Transceiver Information

MLNX-OS offers the option of viewing the transceiver information of a module or cable connected to a specific interface. The information is a set of read-only parameters burned onto the EEPROM of the transceiver by the manufacture. The parameters include identifier (connector type), cable type, speed and additional inventory attributes.

➤ **To display transceiver information of a specific interface, run:**

```
switch (config) # show interfaces ib 1/36 transceiver
Slot 1 port 36 state
 identifier : QSFP+
 cable/ module type : Passive copper, unequalized
 infiniband speeds : SDR , DDR , QDR , FDR
 vendor : Mellanox
 cable length : 2m
 part number : MC2207130-0A1
 revision : A3
 serial number : MT1324VS02215

switch (config) #
```



The indicated cable length is rounded up to the nearest natural number.

### 7.3.2 High Power Transceivers

Mellanox switch systems offer high power transceiver (e.g. LR4) support in the following ports:

- SX6036 – ports 1, 3, 33, 35
- SX6012/SX6710/SX6720 – all ports
- SB7700 – all ports
- TX6000/TX6100 – all uplink ports

If a high power transceiver (e.g. LR4) is inserted to a port that does not support it, the link does not go up, and the following warning message is displayed: “Warning: High power transceiver is not supported” when the command “show interfaces ib” is run.

### 7.3.3 Commands

## interface ib

**interface ib [internal] {<inf> | <inf-range>}**

Enters the InfiniBand interface configuration mode.

|                           |                                                                          |                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | [internal] <inf>                                                         | For 1U switches:<br><br>interface 1/<interface#><br><br>For Director chassis:<br><br>interface ib L<leaf#>/<interface#><br>interface ib internal S<slot#>/<interface#><br>interface ib internal leaf-port<slot#>/<port#> |
|                           | inf-range                                                                | Enters the configuration mode of a range of interfaces.<br>Format: <slot>/<port>-<slot>/<port>                                                                                                                           |
| <b>Default</b>            | N/A                                                                      |                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                   |                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                 |                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                    |                                                                                                                                                                                                                          |
| <b>Example</b>            | switch (config) # interface ib 1/1<br>switch (config interface ib 1/1) # |                                                                                                                                                                                                                          |
| <b>Related Commands</b>   | show interface ib                                                        |                                                                                                                                                                                                                          |
| <b>Note</b>               | Interface range (inf-range) option is not valid on SX65XX systems.       |                                                                                                                                                                                                                          |



## mtu

### mtu <frame-size>

Configures the Maximum Transmission Unit (MTU) frame size for the interface.

|                           |                                                                                         |                                                                                                                                                                 |
|---------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | frame-size                                                                              | Possible Value for MTU                                                                                                                                          |
|                           |                                                                                         | <ul style="list-style-type: none"> <li>• 256 256 bytes</li> <li>• 512 512 bytes</li> <li>• 1K 1K bytes</li> <li>• 2K 2K bytes</li> <li>• 4K 4K bytes</li> </ul> |
| <b>Default</b>            | 4096 bytes                                                                              |                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface IB                                                                     |                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                |                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                   |                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config interface ib 1/1) # mtu 4K switch (config interface ib 1/1) #</pre> |                                                                                                                                                                 |
| <b>Related Commands</b>   | show interface ib                                                                       |                                                                                                                                                                 |
| <b>Note</b>               |                                                                                         |                                                                                                                                                                 |

## shutdown

**shutdown**  
**no shutdown**

Disables the interface.  
The no form of the command enables the interface.

|                           |                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                               |
| <b>Default</b>            | The interface is enabled.                                                         |
| <b>Configuration Mode</b> | Config Interface IB                                                               |
| <b>History</b>            | 3.1.0000                                                                          |
| <b>Role</b>               | admin                                                                             |
| <b>Example</b>            | switch (config interface ib 1/1) # shutdown<br>switch (config interface ib 1/1) # |
| <b>Related Commands</b>   | show interface ib                                                                 |
| <b>Note</b>               | N/A                                                                               |

# description

**description** <string>

Sets an interface description.

|                           |                                                                                                   |          |
|---------------------------|---------------------------------------------------------------------------------------------------|----------|
| <b>Syntax Description</b> | string                                                                                            | 40 bytes |
| <b>Default</b>            | ""                                                                                                |          |
| <b>Configuration Mode</b> | Config Interface IB                                                                               |          |
| <b>History</b>            | 3.1.0000                                                                                          |          |
| <b>Role</b>               | admin                                                                                             |          |
| <b>Example</b>            | switch (config interface ib 1/1) # description my-interface<br>switch (config interface ib 1/1) # |          |
| <b>Related Commands</b>   | show interface ib                                                                                 |          |
| <b>Note</b>               |                                                                                                   |          |

## speed

**speed <port speed>**

Sets the speed of the interface.

|                           |                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port speed                                                                               | Possible options are:<br>1 2.5 Gbps<br>3 2.5 or 5.0 Gbps<br>5 2.5 or 10.0 (QDR) Gbps<br>7 2.5, 5.0 or 10.0 (QDR) Gbps<br>8 10.0 (FDR10) Gbps<br>13 2.5, 10.0 (QDR) or 10.0 (FDR10) Gbps<br>15 2.5, 5.0, 10.0 (QDR) or 10.0 (FDR10) Gbps<br>21 2.5, 10.0 (QDR) or 14.0 Gbps<br>23 2.5, 5.0, 10.0 (QDR) or 14.0 Gbps<br>29 2.5, 10.0 (QDR), 10.0 (FDR10) or 14.0 Gbps<br>31 2.5, 5.0, 10.0 (QDR), 10.0 (FDR10) or 14.0 Gbps |
| <b>Default</b>            | Depends on the port module type, not all interfaces support all speed options            |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config Interface IB                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config interface ib 1/1) # speed 1 switch (config interface ib 1/1) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | show interface ib                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                           |

## op-vls

### **op-vls <value>**

Sets the operational VLs of the interface.

The no form of the command sets the operational VLs to its default value.

|                           |                                                                                           |                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | value                                                                                     | Possible value for operational VLs                                                                                            |
|                           |                                                                                           | <ul style="list-style-type: none"> <li>• 1 VL0</li> <li>• 2 VL0, VL1</li> <li>• 4 VL0 - VL3</li> <li>• 8 VL0 - VL7</li> </ul> |
| <b>Default</b>            | 8 (VL0 - VL7)                                                                             |                                                                                                                               |
| <b>Configuration Mode</b> | Config Interface IB                                                                       |                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                  |                                                                                                                               |
| <b>Role</b>               | admin                                                                                     |                                                                                                                               |
| <b>Example</b>            | <pre>switch (config interface ib 1/1) # op-vls 1 switch (config interface ib 1/1) #</pre> |                                                                                                                               |
| <b>Related Commands</b>   | show interface ib                                                                         |                                                                                                                               |
| <b>Note</b>               |                                                                                           |                                                                                                                               |

# width

**width <value>**

Sets the speed of the interface.  
The no form of the command sets the speed of the interface to its default value.

|                           |                                                                                  |                                                                                                   |
|---------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | value                                                                            | Possible value for width: <ul style="list-style-type: none"><li>• 11X</li><li>• 51X, 4X</li></ul> |
| <b>Default</b>            | 5 (1X, 4X)                                                                       |                                                                                                   |
| <b>Configuration Mode</b> | Config Interface IB                                                              |                                                                                                   |
| <b>History</b>            | 3.1.0000                                                                         |                                                                                                   |
| <b>Role</b>               | admin                                                                            |                                                                                                   |
| <b>Example</b>            | switch (config interface ib 1/1) # width 1<br>switch (config interface ib 1/1) # |                                                                                                   |
| <b>Related Commands</b>   | show interface ib                                                                |                                                                                                   |
| <b>Note</b>               |                                                                                  |                                                                                                   |

## clear counters

### clear counters

Clears the interface counters.

|                           |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                     |
| <b>Default</b>            | N/A                                                                                     |
| <b>Configuration Mode</b> | Config Interface IB                                                                     |
| <b>History</b>            | 3.1.0000                                                                                |
| <b>Role</b>               | admin                                                                                   |
| <b>Example</b>            | switch (config interface ib 1/1) # clear counters<br>switch (config interface ib 1/1) # |
| <b>Related Commands</b>   | show interface ib                                                                       |
| <b>Note</b>               |                                                                                         |

## show interfaces ib

**show interfaces ib [internal] <inf>**

Displays the configuration and status for the interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | internal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Internal interfaces.                                                                                     |
|                           | inf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Slot/Port (i.e. 1/1)</li> <li>LXX/SXX (i.1 L01 or S01)</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                          |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show interfaces ib 1/1 Slot 1 port 1 state     Logical port state      : Down     Physical port state    : Disabled     Current line rate      : 10.0 Gbps     Supported speeds       : 2.5, 5.0, 10.0(FDR10) or 14.0 Gbps rate     Speed                  : 2.5 Gbps rate only     Supported widths       : 1X, 4X     Width                  : 4X     Max supported MTUs     : 4096     MTU                    : 4096     VL capabilities        : VL0 - VL7     Operational VLS        : VL0 - VL7     Description            :     Phy-profile            : high-speed-ber      RX bytes               : 0     RX packets              : 0     RX errors               : 0     Symbol errors           : 0     VL15 dropped packets   : 0      TX bytes               : 0     TX packets              : 0     TX wait                 : 0     TX discarded packets   : 0</pre> <p>switch (config) #</p> |                                                                                                          |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                          |
| <b>Note</b>               | <p>If a high power transceiver (e.g. LR4) is inserted to a port that does not support it, the link will not go up, and the following warning message is displayed: “Warning: High power transceiver is not supported” when the command “show interfaces ib” is run. For more information, please refer to <a href="#">Section 7.3.2, “High Power Transceivers,” on page 999</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                          |



## show interfaces ib status

**show interfaces ib [[internal] leaf-ports] [<inf>] status**

Displays the status, speed and negotiation mode of the specified interface.

|                    |                                             |                                  |                   |                     |
|--------------------|---------------------------------------------|----------------------------------|-------------------|---------------------|
| Syntax Description | internal                                    | Internal interfaces              |                   |                     |
|                    | leaf-ports                                  | filter to leaf-ports only        |                   |                     |
|                    | inf                                         | Interface number: <slot>/<port>. |                   |                     |
| Default            | N/A                                         |                                  |                   |                     |
| Configuration Mode | Any Command Mode                            |                                  |                   |                     |
| History            | 3.2.0500                                    |                                  |                   |                     |
| Role               | admin                                       |                                  |                   |                     |
| Example            | switch (config) # show interfaces ib status |                                  |                   |                     |
|                    | Interface Description                       |                                  | Current line rate | Logical port state  |
|                    |                                             |                                  |                   | Physical port state |
|                    | -----                                       |                                  |                   |                     |
|                    | Ib 1/1                                      | my-if                            | 10.0 Gbps         | Down                |
|                    | Ib 1/2                                      | my-other-if                      | 10.0 Gbps         | Down                |
| ....               |                                             |                                  |                   |                     |
|                    | switch (config) #                           |                                  |                   |                     |
| Related Commands   |                                             |                                  |                   |                     |
| Note               |                                             |                                  |                   |                     |

## show interfaces ib transceiver

**show interfaces ib [<inf>] transceiver**

Displays the transceiver info.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | inf interface number: <slot>/<port>                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show interfaces ib 1/1 transceiver Slot L01 port 13 state     identifier           : QSFP+     cable/ module type   : Passive copper, unequalized     infiniband speeds     : SDR , DDR , QDR     vendor               : Mellanox     cable length         : 2 m     part number          : MC2207130-002     revision             : B0     serial number        : AA051150077 switch (config) #</pre>         |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>For a full list of the supported cables and transceivers, please refer to the LinkX™ Cables and Transceivers webpage in Mellanox.com: <a href="http://www.mellanox.com/page/cables?mtag=cable_overview">http://www.mellanox.com/page/cables?mtag=cable_overview</a>.</li> <li>If a high power transceiver (e.g. LR4) is used, it will be indicated in the field “cable/module type”</li> </ul> |

## show interface ib capabilities

**show interface ib <inf> capabilities**

Shows interface capabilities.

|                           |                                                                                                            |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | inf                                                                                                        | Slot/port (i.e. 1/1). |
| <b>Default</b>            | N/A                                                                                                        |                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                           |                       |
| <b>History</b>            | 3.2.0500                                                                                                   |                       |
| <b>Role</b>               | admin                                                                                                      |                       |
| <b>Example</b>            | switch (config) # show interfaces ib 1/1 capabilities<br><br>Ib 1/1<br>LLR: FDR10, FDR,<br>switch (config) |                       |
| <b>Related Commands</b>   |                                                                                                            |                       |
| <b>Note</b>               |                                                                                                            |                       |

## 7.4 Subnet Manager (SM)

The InfiniBand Subnet Manager (SM) is a centralized entity running in the switch. The SM discovers and configures all the InfiniBand fabric devices to enable traffic flow between those devices.

The SM applies network traffic related configurations such as Quality of Service (QoS), routing, and partitioning of the fabric devices. You can view and configure the Subnet Parameters (SM) via the CLI/WebUI menu. The embedded SM on the MLNX-OS can be used to manage fabrics up to 648 nodes.

### 7.4.1 Enabling Subnet Manager

The SM is used to discover and configure all the InfiniBand fabric devices to enable traffic flow between those devices.

➤ **To enable Subnet Manager:**

**Step 1.** Enable - `ib smnode <name> enable`

Enables the Subnet Manager. Subnet Manager is disabled by default.

**Step 2.** [Optional] Priority - `ib smnode <name> sm-priority <priority>`

Sets the Subnet Manager priority on the system. Subnet Manager's default priority is 0.



Changing the host name closes the SM manager session. To restart SM please run `ib smnode <new hostname> enable`.

### 7.4.2 Partitions

Partitioning enforces isolation among systems sharing an InfiniBand fabric. Partitioning is not related to boundaries established by subnets, switches, or routers. Rather, a partition describes a set of end nodes within the fabric that may communicate. Each port of an end node is a member of at least one partition and may be a member of multiple partitions. A partition manager (part of the SM) assigns partition keys (PKEYs) to each channel adapter port. Each PKEY represents a partition. Reception of an invalid PKEY causes the packet to be discarded. Switches and routers may optionally be used to enforce partitioning. In this case the partition manager programs the switch or router with PKEY information and when the switch or router detects a packet with an invalid PKEY, it discards the packet.

Fabric administration can assign certain Service Levels (SLs) for particular partitions. This allows the SM to isolate traffic flows between those partitions, and even if both partitions operate at the same QoS level, each partition can be guaranteed its fair share of bandwidth regardless of whether nodes in other partitions misbehave or are over subscribed.

The switch enables the configuration of partitions in an InfiniBand fabric.

The default partition is created by the SM unconditionally (whether it was defined or not).

#### 7.4.2.1 Relationship with ib0 Interface

IP interface “ib0” is running under the default PKEY (0x7fff) and can be used for inband management connectivity to the system.

### 7.4.2.2 Configuring Partition



The partitions configuration is applicable and to be used only when the SM is enabled and running on the system.

➤ **To configure a partition:**

**Step 1.** Create a partition. Run:

```
switch (config) # ib partition my-partition pkey 0x7ff2
```

**Step 2.** Enter partition configuration mode. Run:

```
switch (config) # partition my-partition
switch (config partition name my-partition) #
```

**Step 3.** Add partition members. Run:

```
switch (config partition my-partition) # member all
```

**Step 4.** Verify the partition configuration. Run:

```
switch (config partition my-partition) # show ib partition
Default
 PKey = 0x7FFF
 defmember = full
 ipoib = yes
members
 GUID='ALL' member='full'
my-partition
 PKey = 0x7ff2
members
 GUID='ALL' member='default'
switch (config partition name my-partition) #
```

### 7.4.3 Adaptive Routing

Adaptive routing (AR) allows optimizing data traffic flow. The InfiniBand protocol uses multiple paths between any two points. Thus, when unexpected traffic patterns cause some paths to be overloaded, AR can automatically move traffic to less congested paths according to the current temporal state of the network.



The embedded SM over the switch does not support configuring adaptive routing. To use this option in the fabric please use an external SM.

AR support is enabled by default on system profile “ib-single-switch”. To disable AR run the command system profile ib-no-adaptive-routing-single-switch.



The AR option needs to be enabled in the SM for it to take affect.

## 7.4.4 Commands

### 7.4.4.1 Subnet Manager (SM)

#### **ib sm**

**ib sm**

**no ib sm**

Enables the SM on this node.

The no form of the command disables the SM on this node.

|                           |                                              |
|---------------------------|----------------------------------------------|
| <b>Syntax Description</b> | N/A                                          |
| <b>Default</b>            | disable                                      |
| <b>Configuration Mode</b> | Config                                       |
| <b>History</b>            | 3.1.0000                                     |
| <b>Role</b>               | admin                                        |
| <b>Example</b>            | switch (config) # ib sm<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm                                   |
| <b>Note</b>               |                                              |

## ib sm accum-log-file

**ib sm accum-log-file**  
**no ib sm accum-log-file**

Adds SM log entries at the end of the current log.  
 The no form of the command overwrites SM log file on every restart.

|                           |                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                  |
| <b>Default</b>            | Enabled                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                             |
| <b>Role</b>               | admin                                                                                                                |
| <b>Example</b>            | switch (config) # ib sm accum-log-file<br>switch (config) # show ib sm accum-log-file<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm accum-log-file                                                                                            |
| <b>Note</b>               |                                                                                                                      |

## ib sm allow-both-pkeys

**ib sm allow-both-pkeys**  
**no ib sm allow-both-pkeys**

Enables having both full and limited membership on the same partition.  
 The no form of the command disables having both full and limited membership on the same partition.

|                           |                                                               |
|---------------------------|---------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                           |
| <b>Default</b>            | Disabled                                                      |
| <b>Configuration Mode</b> | Config                                                        |
| <b>History</b>            | 3.4.1100                                                      |
| <b>Role</b>               | admin                                                         |
| <b>Example</b>            | switch (config) # ib sm allow-both-pkeys<br>switch (config) # |
| <b>Related Commands</b>   | defmember<br>member                                           |
| <b>Note</b>               |                                                               |



## ib sm babbling-policy

**ib sm babbling-policy**  
**no ib sm babbling-policy**

Enables the SM to disable babbling ports (i.e., generating frequent traps).  
 The no form of the command disables the SM babbling policy.

|                           |                                                                                                                                                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                           |
| <b>Default</b>            | disable                                                                                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # no ib sm babbling-policy switch (config) # show ib sm babbling-policy disable switch (config) #</pre>                                  |
| <b>Related Commands</b>   | show ib sm babbling-policy                                                                                                                                    |
| <b>Note</b>               | In case the babbling policy is enabled, and decides to close a babbling interface (one which sends 129,130,131 traps, for example), the SM disables the port. |

## ib sm connect-roots

**ib sm connect-roots**  
**no ib sm connect-roots**

Forces the routing engine to make connectivity between root switches.  
 The no form of the command disables logical LID path between root switches.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Default</b>            | true                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # ib sm connect-roots switch (config) # show ib sm connect-roots true switch (config) #</pre>                                                                                                                                                                                                                                                                                                                              |
| <b>Related Commands</b>   | show ib sm connect-roots                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This command is relevant only for 'updn' and 'ftree' algorithm (refer to 'ib sm routing-engines' command)</li> <li>• This option enforces routing engines (up/down and fat-tree) to make connectivity between root switches and in this way to be fully IBA complaint. This may violate the "deadlock-free" status of the algorithm. Hence, it is recommended to use the command carefully.</li> </ul> |

## ib sm enable-quirks

**ib sm enable-quirks**  
**no ib sm enable-quirks**

Enables the SM to use high risk features and handle hardware workarounds.  
 The no form of the command disables the SM from using high risk features and hardware workarounds.

|                           |                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                |
| <b>Default</b>            | disable                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                           |
| <b>Role</b>               | admin                                                                                                              |
| <b>Example</b>            | switch (config) # ib sm enable-quirks<br>switch (config) # show ib sm enable-quirks<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm enable-quirks                                                                                           |
| <b>Note</b>               |                                                                                                                    |

## ib sm exit-on-fatal

**ib sm exit-on-fatal**  
**no ib sm exit-on-fatal**

Enables the SM to exit upon fatal initialization errors.  
 The no form of the command disables the SM from exiting upon fatal initialization errors.

|                           |                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                  |
| <b>Default</b>            | enable                                                                                                               |
| <b>Configuration Mode</b> | Config                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                             |
| <b>Role</b>               | admin                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # ib sm exit-on-fatal switch (config) # show ib sm exit-on-fatal enable switch (config) #</pre> |
| <b>Related Commands</b>   | show ib sm exit-on-fatal                                                                                             |
| <b>Note</b>               |                                                                                                                      |

## ib sm force-link-speed

### ib sm force-link-speed <speed-options>

Defines the SM behavior for PortInfo:LinkSpeedEnabled parameter on switch ports.

|                           |                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | speed-options                                                                                                                                                                                                                                                                       | <p>The following options are available:</p> <ul style="list-style-type: none"> <li>• 0 - Does not modify the switch assigned default value</li> <li>• 1 – Negotiates only 2.5 Gb/s rate only</li> <li>• 3 – Negotiates only 2.5 or 5.0 Gb/s rates</li> <li>• 5 – Negotiates only 2.5 or 10.0 Gb/s rates</li> <li>• 7 – Negotiates only 2.5, 5.0, or 10.0 Gb/s rates</li> <li>• 13 – Negotiates 2.5, 10.0 (QDR) or 10.0 (FDR10) Gb/s</li> <li>• 15 – Negotiates 2.5, 5.0, 10.0 (QDR) or 10.0 (FDR10) Gb/s</li> <li>• 21 – Negotiates 2.5, 10.0 (QDR) or 14.0 Gb/s</li> <li>• 23 – Negotiates 2.5, 5.0, 10.0 (QDR) or 14.0 Gb/s</li> <li>• 29 – Negotiates 2.5, 10.0 (QDR), 10.0 (FDR10) or 14.0 Gb/s</li> <li>• 31 – Negotiates 2.5, 5.0, 10.0 (QDR), 10.0 (FDR10) or 14.0 Gb/s</li> </ul> |
| <b>Default</b>            | 15                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # ib sm force-link-speed 7 switch (config) # show ib sm force-link-speed 7 (Negotiate 2.5, 5.0, or 10.0 Gbps rate) switch (config) #</pre>                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Commands</b>   | show ib sm force-link-speed                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• The following options, as defined in <i>InfiniBand Specification 1.2.1</i> section 14.2.5.6, table 145 “PortInfo”</li> <li>• This command updates force-link-speed, force-link-speed ext and fdr10 which are open sm parameters</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## ib sm force-log-flush

**ib sm force-log-flush**  
**no ib sm force-log-flush**

Forces every log message generated to be flushed.  
 The no form of the command does not force a flush after every log write.

|                           |                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                    |
| <b>Default</b>            | disable                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                               |
| <b>Role</b>               | admin                                                                                                                  |
| <b>Example</b>            | switch (config) # ib sm force-log-flush<br>switch (config) # show ib sm force-log-flush<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm force-log-flush                                                                                             |
| <b>Note</b>               |                                                                                                                        |

## ib sm guid2lid-cache

**ib sm guid2lid-cache**  
**no ib sm guid2lid-cache**

Allows SM to use cached GUID-to-lid mapping data. When enabled, the SM honors the cached GUID-to-lid mapping information if:

- It exists
- It is valid
- sm\_reassign\_lids is disabled

The no form of the command disallows use of cached GUID-to-lid mapping data.

|                           |                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                  |
| <b>Default</b>            | disable                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                             |
| <b>Role</b>               | admin                                                                                                                |
| <b>Example</b>            | switch (config) # ib sm guid2lid-cache<br>switch (config) # show ib sm guid2lid-cache<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm guid2lid-cache                                                                                            |
| <b>Note</b>               |                                                                                                                      |

## ib sm honor-partitions

**ib sm honor-partitions**  
**no ib sm honor-partitions**

Sets the no\_partition\_enforcement flag to 0. This setting controls global support for partitioning in the subnet.  
 The no form of the command disables subnet partition support.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>            | Enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # no ib sm honor-partitions switch (config) # show ib sm honor-partitions disable switch (config) #</pre>                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Commands</b>   | show ib sm honor-partitions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If partitioning is disabled (no_partition_enforcement=1), then no named partitions can be enabled</li> <li>• If partitioning is enabled globally, the no_partition_enforcement changes from 1 to 0, and all defined partitions with state enabled are instantiated</li> <li>• If partitioning is globally disabled, all partitions are removed from the subnet, but the state (enabled or disabled) associated with defined partitions is not modified</li> </ul> |



## ib sm hoq-lifetime

### **ib sm hoq-lifetime <time>**

Sets the maximum time a frame can wait at the head of a switch-to-switch port queue before it is dropped.

|                           |                                                                                                                                   |                                                                                                                                                          |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                              | The time is 4.096 uS * 2time. The range of time is 0 to 20. A time of 20 means infinite, and the default value is 18 which translates to about 1 second. |
| <b>Default</b>            | 0x12 (About 1 second)                                                                                                             |                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                            |                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                          |                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                             |                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # ib sm hoq-lifetime 15 switch (config) # show ib sm hoq-lifetime 0xF (About 134 mS) switch (config) #</pre> |                                                                                                                                                          |
| <b>Related Commands</b>   | show ib sm hoq-lifetime                                                                                                           |                                                                                                                                                          |
| <b>Note</b>               |                                                                                                                                   |                                                                                                                                                          |

## ib sm ignore-other-sm

**ib sm ignore-other-sm**  
**no ib sm ignore-other-sm**

Ignores all the rules governing SM elections and attempts to manage the fabric.  
 The no form of the command does not allow the SM to manage fabric if it loses the election.

|                           |                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                    |
| <b>Default</b>            | Disable                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                               |
| <b>Role</b>               | admin                                                                                                                  |
| <b>Example</b>            | switch (config) # ib sm ignore-other-sm<br>switch (config) # show ib sm ignore-other-sm<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm ignore-other-sm                                                                                             |
| <b>Note</b>               |                                                                                                                        |

## ib sm ipv6-nsm

**ib sm ipv6-nsm**  
**no ib sm ipv6-nsm**

Consolidates IPv6 SNM group joins to 1 MC group per-MGID PKEY.  
 The no form of the command disables the consolidation of IPv6 SNM.

|                           |                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                      |
| <b>Default</b>            | Disable                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                   |
| <b>History</b>            | 3.1.0000                                                                                                 |
| <b>Role</b>               | admin                                                                                                    |
| <b>Example</b>            | switch (config) # ib sm ipv6-nsm<br>switch (config) # show ib sm ipv6-nsm<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm ipv6-nsm                                                                                      |
| <b>Note</b>               |                                                                                                          |

## ib sm lash

**ib sm lash {do-mesh-analysis | start-vl <vl-value>}**

**no ib sm lash do-mesh-analysis**

Modifies “lash” routing method parameters.

The no form of the command disables SM “lash” routing for mesh analysis.

|                           |                                                                                                                                    |                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | do-mesh-analysis                                                                                                                   | Enables SM “lash” routing for mesh analysis.                                                               |
|                           | start-vl <vl-value>                                                                                                                | Configures the starting VL for SM “lash” routing for mesh analysis (assuming that lash routing is enabled) |
| <b>Default</b>            | do-mesh-analysis: disable<br>start-vl: 0                                                                                           |                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                             |                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                           |                                                                                                            |
| <b>Role</b>               | admin                                                                                                                              |                                                                                                            |
| <b>Example</b>            | switch (config) # ib sm lash do-mesh-analysis<br>switch (config) # show ib sm lash do-mesh-analysis<br>enable<br>switch (config) # |                                                                                                            |
| <b>Related Commands</b>   | show ib sm lash do-mesh-analysis                                                                                                   |                                                                                                            |
| <b>Note</b>               |                                                                                                                                    |                                                                                                            |

## ib sm leafhoq-lifetime

**ib sm leafhoq-lifetime <time>**

Sets the maximum time a frame can wait at the head of a switch-to-CA\_or\_Router port queue before it is dropped.

|                           |                                                                                                                                        |                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                   | The time is 4.096 uS * 2time. The range of time is 0 to 20. A time of 20 means infinite, and the default value is 18 which translates to about 1 second. |
| <b>Default</b>            | 0x10 (about 268 mS)                                                                                                                    |                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                 |                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                               |                                                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                  |                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # ib sm leafhoq-lifetime 8 switch (config) # show ib sm leafhoq-lifetime 0x8 (About 1 mS) switch (config) #</pre> |                                                                                                                                                          |
| <b>Related Commands</b>   | show ib sm leafhoq-lifetime                                                                                                            |                                                                                                                                                          |
| <b>Note</b>               |                                                                                                                                        |                                                                                                                                                          |

## ib sm leafvl-stalls

**ib sm leafvl-stalls <count>**

Sets the number of sequential frame drops that cause a switch-to-CA\_or\_Router port to enter the VLStalled state.

|                           |                                                                                                                 |       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|-------|
| <b>Syntax Description</b> | count                                                                                                           | 1-255 |
| <b>Default</b>            | 7                                                                                                               |       |
| <b>Configuration Mode</b> | Config                                                                                                          |       |
| <b>History</b>            | 3.1.0000                                                                                                        |       |
| <b>Role</b>               | admin                                                                                                           |       |
| <b>Example</b>            | switch (config) # ib sm leafvl-stalls 3<br>switch (config) # show ib sm leafvl-stalls<br>3<br>switch (config) # |       |
| <b>Related Commands</b>   | show ib sm leafvl-stalls                                                                                        |       |
| <b>Note</b>               |                                                                                                                 |       |

## ib sm lmc

### ib sm lmc <mask>

Sets the LID Mask Control (LMC) value to be used on this subnet.

|                           |                                                                                                 |                       |
|---------------------------|-------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | mask                                                                                            | Valid values are 0-7. |
| <b>Default</b>            | The default value is 0, which means that every port has exactly one unique LID.                 |                       |
| <b>Configuration Mode</b> | Config                                                                                          |                       |
| <b>History</b>            | 3.1.0000                                                                                        |                       |
| <b>Role</b>               | admin                                                                                           |                       |
| <b>Example</b>            | <pre>switch (config) # ib sm lmc 7 switch (config) # show ib sm lmc 0x7 switch (config) #</pre> |                       |
| <b>Related Commands</b>   | show ib sm lmc                                                                                  |                       |
| <b>Note</b>               |                                                                                                 |                       |

## ib sm lmc-esp0

**ib sm lmc-esp0**  
**no ib sm lmc-esp0**

Sets the LMC for the subnet to be used for Enhanced Switch Port 0.

|                           |                                                       |
|---------------------------|-------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                   |
| <b>Default</b>            | disable                                               |
| <b>Configuration Mode</b> | Config                                                |
| <b>History</b>            | 3.1.0000                                              |
| <b>Role</b>               | admin                                                 |
| <b>Example</b>            | switch (config) # ib sm lmc-esp0<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm lmc-esp0                                   |
| <b>Note</b>               |                                                       |



## ib sm log-flags

**ib sm log-flags [all] [debug] [error] [frames] [funcs] [info] [none] [routing] [verbose]**

**no ib sm log-flags**

Controls what messages the SM logs.

The no form of the command indicates to the SM not to run on this node.

|                           |                                                                                                                                                                                                        |                                                                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | all                                                                                                                                                                                                    | Turns on all the flags that follow (error info verbose debug funcs frames routing). |
|                           | debug                                                                                                                                                                                                  | Logs diagnostic messages, high volume.                                              |
|                           | error                                                                                                                                                                                                  | Logs error messages.                                                                |
|                           | frames                                                                                                                                                                                                 | Logs all SMP and GMP frames.                                                        |
|                           | funcs                                                                                                                                                                                                  | Logs function entry/exit, very high volume.                                         |
|                           | info                                                                                                                                                                                                   | Logs basic messages, low volume.                                                    |
|                           | none                                                                                                                                                                                                   | Turns off all logging flags.                                                        |
|                           | routing                                                                                                                                                                                                | Logs FDB routing information.                                                       |
|                           | verbose                                                                                                                                                                                                | Logs interesting stuff, moderate volume.                                            |
| <b>Default</b>            | 0x3 (error, info)                                                                                                                                                                                      |                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                 |                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                               |                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                  |                                                                                     |
| <b>Example</b>            | <pre>switch (config) # ib sm log-flags error verbose funcs frames switch (config) # show ib sm log-flags 0x35 (error, verbose, funcs, frames) switch (config) #</pre>                                  |                                                                                     |
| <b>Related Commands</b>   | show ib sm log-flags                                                                                                                                                                                   |                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Every execution of this command replaces the current logging flags</li> <li>• The options “all” and “none” must be specified as the only parameter</li> </ul> |                                                                                     |

## ib sm log-max-size

**ib sm log-max-size <size>**

Sets the maximum size of the log file to be <size> megabytes.

|                           |                                                                                                                                |                                                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | size                                                                                                                           | Sets the size of the SM log in megabytes. If size is set to '0', the log continues to grow to the size of the storage available. |
| <b>Default</b>            | 60 MBytes                                                                                                                      |                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                         |                                                                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                                       |                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                          |                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # ib sm log-max-size 50 switch (config) # show ib sm log-max-size 50 MBytes switch (config) #</pre>       |                                                                                                                                  |
| <b>Related Commands</b>   | show ib sm log-max-size                                                                                                        |                                                                                                                                  |
| <b>Note</b>               | When the log gets to the maximum size, or system storage fills up, the current log is deleted and messages start accumulating. |                                                                                                                                  |

## ib sm max-op-vls

**ib sm max-op-vls <count>**

Sets the maximum number of VLs supported on this subnet.

|                           |                                                                                                           |                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Syntax Description</b> | count                                                                                                     | Possible values: 1, 2, 4, 8, or 15. |
| <b>Default</b>            | 15                                                                                                        |                                     |
| <b>Configuration Mode</b> | Config                                                                                                    |                                     |
| <b>History</b>            | 3.1.0000                                                                                                  |                                     |
| <b>Role</b>               | admin                                                                                                     |                                     |
| <b>Example</b>            | switch (config) # ib sm max-op-vls 4<br>switch (config) # show ib sm max-op-vls<br>4<br>switch (config) # |                                     |
| <b>Related Commands</b>   | show ib sm max-op-vls                                                                                     |                                     |
| <b>Note</b>               |                                                                                                           |                                     |

## ib sm max-reply-time

**ib sm max-reply-time <time>**

Sets the maximum time the SM waits for a reply before the transaction times out.

|                           |                                                                                                                                    |                                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                               | Must be an integer (in milliseconds). |
| <b>Default</b>            | 200 milliseconds                                                                                                                   |                                       |
| <b>Configuration Mode</b> | Config                                                                                                                             |                                       |
| <b>History</b>            | 3.1.0000                                                                                                                           |                                       |
| <b>Role</b>               | admin                                                                                                                              |                                       |
| <b>Example</b>            | switch (config) # ib sm max-reply-time 500<br>switch (config) # show ib sm max-reply-time<br>500 milliseconds<br>switch (config) # |                                       |
| <b>Related Commands</b>   | show sm max-reply-time                                                                                                             |                                       |
| <b>Note</b>               |                                                                                                                                    |                                       |

## ib sm max-reverse-hops

**ib sm max-reverse-hops <max-reverse-hops>**

Sets the maximum number of hops from the top switch to an I/O node.

|                           |                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                              |
| <b>Default</b>            | 0 hops                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # ib sm max-reverse-hops 500 switch (config) # show ib sm max-reverse-hops 500 hops switch (config) #</pre> |
| <b>Related Commands</b>   | show ib sm max-reverse-hops                                                                                                      |
| <b>Note</b>               |                                                                                                                                  |

## ib sm max-wire-smpps

**ib sm max-wire-smpps <count>**

Sets the maximal number of MADs the SM has outstanding at one time to count.

|                           |                                                                                                                     |                                                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | count                                                                                                               | Number of concurrent mgmt packets. The value must be an integer. |
| <b>Default</b>            | 4                                                                                                                   |                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                              |                                                                  |
| <b>History</b>            | 3.1.0000                                                                                                            |                                                                  |
| <b>Role</b>               | admin                                                                                                               |                                                                  |
| <b>Example</b>            | <pre>switch (config) # ib sm max-wire-smpps 8 switch (config) # show ib sm max-wire-smpps 8 switch (config) #</pre> |                                                                  |
| <b>Related Commands</b>   | show ib sm max-wire-smpps                                                                                           |                                                                  |
| <b>Note</b>               |                                                                                                                     |                                                                  |

## ib sm max-wire-smpps2

**ib sm max-wire-smpps2 <count>**

Sets the maximal timeout based outstanding SM management packets.

|                           |                                                                                                                     |                                                                        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | count                                                                                                               | Number of concurrent management packets. The value must be an integer. |
| <b>Default</b>            | 4                                                                                                                   |                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                              |                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                            |                                                                        |
| <b>Role</b>               | admin                                                                                                               |                                                                        |
| <b>Example</b>            | <pre>switch (config) # ib sm max-wire-smpps 8 switch (config) # show ib sm max-wire-smpps 8 switch (config) #</pre> |                                                                        |
| <b>Related Commands</b>   | show ib sm max-wire-smpps2                                                                                          |                                                                        |
| <b>Note</b>               |                                                                                                                     |                                                                        |

## ib sm msgfifo-timeout

**ib sm msgfifo-timeout <time>**

Sets the time value to be used by the subnet administrator to control when a BUSY status is returned to a client.

|                           |                                                                                                                                                                                       |                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Syntax Description</b> | time                                                                                                                                                                                  | In milliseconds. |
| <b>Default</b>            | 10 seconds                                                                                                                                                                            |                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                |                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                              |                  |
| <b>Role</b>               | admin                                                                                                                                                                                 |                  |
| <b>Example</b>            | <pre>switch (config) # ib sm msgfifo-timeout 50000 switch (config) # show ib sm msgfifo-timeout 50.000 seconds switch (config) #</pre>                                                |                  |
| <b>Related Commands</b>   | show ib sm msgfifo-timeout                                                                                                                                                            |                  |
| <b>Note</b>               | If there is more than one message in the SA queue, and it has been there longer than time milliseconds, all additional incoming requests are immediately replied to with BUSY status. |                  |

## ib sm multicast

**ib sm multicast**  
**no ib sm multicast**

Enables the SM to support multicasts on the fabric.  
 The no form of the command disables the SM from supporting multicasts on the fabric.

|                           |                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                        |
| <b>Default</b>            | Disable                                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                   |
| <b>Role</b>               | admin                                                                                                      |
| <b>Example</b>            | switch (config) # ib sm multicast<br>switch (config) # show ib sm multicast<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm multicast                                                                                       |
| <b>Note</b>               |                                                                                                            |



## ib sm no-client-rereg

**ib sm no-client-rereg**  
**no ib sm no-client-rereg**

Enables client re-registration requests.  
 The no form of the command disables client re-registration requests.

|                           |                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                    |
| <b>Default</b>            | disable                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                               |
| <b>Role</b>               | admin                                                                                                                  |
| <b>Example</b>            | switch (config) # ib sm no-client-rereg<br>switch (config) # show ib sm no-client-rereg<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm no-client-rereg                                                                                             |
| <b>Note</b>               |                                                                                                                        |

## ib sm overrun-trigger

**ib sm overrun-trigger <count>**

Enables SMA to generate standard InfiniBand trap number 130 when the number of local buffer overrun errors equals the count value, and the port's SMA supports traps.

|                           |                                                                                                                       |               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Syntax Description</b> | count                                                                                                                 | Range: 0-255. |
| <b>Default</b>            | 8                                                                                                                     |               |
| <b>Configuration Mode</b> | Config                                                                                                                |               |
| <b>History</b>            | 3.1.0000                                                                                                              |               |
| <b>Role</b>               | admin                                                                                                                 |               |
| <b>Example</b>            | <pre>switch (config) # ib sm overrun-trigger 3 switch (config) # show ib sm overrun-trigger 3 switch (config) #</pre> |               |
| <b>Related Commands</b>   | show ib sm overrun-trigger                                                                                            |               |
| <b>Note</b>               | Refer to the <i>InfiniBand Architecture Specification V1 r1.2.1</i> , section 14.2.5.1 table 131: Traps.              |               |

## ib sm packet-life-time

### ib sm packet-life-time <time>

Sets the maximum time a frame can live in a switch.

|                           |                                                                                                                                        |                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                   | The time is 4.096 uS * 2*<time>. The rang is: 0-20. A time of 20 means infinite. The value 0x14 disables this mechanism. |
| <b>Default</b>            | 0x12 (about 1 second)                                                                                                                  |                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                                                 |                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                                                               |                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                  |                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # ib sm packet-life-time 20 switch (config) # show ib sm packet-life-time 0x14 (Infinite) switch (config) #</pre> |                                                                                                                          |
| <b>Related Commands</b>   | show ib sm packet-life-time                                                                                                            |                                                                                                                          |
| <b>Note</b>               |                                                                                                                                        |                                                                                                                          |

## ib sm phy-err-trigger

**ib sm phy-err-trigger <count>**

Enables SMA to generate trap 129 when the number of local link integrity errors equals the <count> value, and the port's SMA supports traps.

|                           |                                                                                                                       |                  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Syntax Description</b> | count                                                                                                                 | Range is: 0-255. |
| <b>Default</b>            | 8                                                                                                                     |                  |
| <b>Configuration Mode</b> | Config                                                                                                                |                  |
| <b>History</b>            | 3.1.0000                                                                                                              |                  |
| <b>Role</b>               | admin                                                                                                                 |                  |
| <b>Example</b>            | <pre>switch (config) # ib sm phy-err-trigger 5 switch (config) # show ib sm phy-err-trigger 5 switch (config) #</pre> |                  |
| <b>Related Commands</b>   | show ib sm phy-err-trigger                                                                                            |                  |
| <b>Note</b>               |                                                                                                                       |                  |

## ib sm polling-retries

**ib sm polling-retries <value>**

This variable defines the number of consecutive times an active SM must fail to respond before it is declared dead.

|                           |                                                                                                                                       |                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | value                                                                                                                                 | Must be an integer. |
| <b>Default</b>            | 4                                                                                                                                     |                     |
| <b>Configuration Mode</b> | Config                                                                                                                                |                     |
| <b>History</b>            | 3.1.0000                                                                                                                              |                     |
| <b>Role</b>               | admin                                                                                                                                 |                     |
| <b>Example</b>            | <pre>switch (config) # ib sm polling-retries 8 switch (config) # show ib sm polling-retries 8 switch (config) #</pre>                 |                     |
| <b>Related Commands</b>   | show ib sm polling-retries                                                                                                            |                     |
| <b>Note</b>               | The time between when the active SM fails and the time this SM declares it dead is: (sm_sminfo_polling_timeout * value) milliseconds. |                     |

## ib sm port-prof-switch

**ib sm port-prof-switch**  
**no ib sm port-prof-switch**

Enables the counting of adapters, routers, and switches routed through links.  
 The no form of the command disables the counting of adapters, routers, and switches routed through links.

|                           |                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                    |
| <b>Default</b>            | False                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                               |
| <b>Role</b>               | admin                                                                                                                  |
| <b>Example</b>            | switch (config) # ib sm port-prof-switch<br>switch (config) # show ib sm port-prof-switch<br>true<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm port-prof-switch                                                                                            |
| <b>Note</b>               |                                                                                                                        |

## ib sm reassign-lids

**ib sm reassign-lids**  
**no ib sm reassign-lids**

Controls the ability of the SM to reassign LIDs to nodes it finds already configured with a valid LID.

The no form of the command disables the SM from reassigning LIDs to nodes it finds already configured with a valid LID.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>            | disable                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Example</b>            | <pre>switch (config) # ib sm reassign-lids switch (config) # show ib sm reassign-lids enable switch (config) #</pre>                                                                                                                                                                                                                                                                                                                        |
| <b>Related Commands</b>   | show ib sm reassign-lids                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If enabled (ib sm reassign-lids), the SM can, but is not required to, reassign the LID on a node with a pre-configured LID</li> <li>• If disabled (no ib sm reassign-lids), the SM does not reassign LIDs</li> <li>• There are times when the SM is required to reassign LIDs or the fabric cannot be brought to a stable state, or a fabric option (like LMC) can not be fully applied</li> </ul> |

## ib sm reset-config

### ib sm reset-config

Resets all SM configuration options to defaults.

|                           |                                                           |
|---------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                       |
| <b>Default</b>            | N/A                                                       |
| <b>Configuration Mode</b> | Config                                                    |
| <b>History</b>            | 3.1.0000                                                  |
| <b>Role</b>               | admin                                                     |
| <b>Example</b>            | switch (config) # ib sm reset-config<br>switch (config) # |
| <b>Related Commands</b>   |                                                           |
| <b>Note</b>               |                                                           |



## ib sm root-guid

**ib sm root-guid <guid>**  
**no ib sm root-guid <guid>**

Adds a root GUID for the SM.  
 The no form of the command removes the GUID from the root GUID list.

|                           |                                                                                                                            |                                               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Syntax Description</b> | guid                                                                                                                       | The root GUID number in hexadecimal notation. |
| <b>Default</b>            | N/A                                                                                                                        |                                               |
| <b>Configuration Mode</b> | Config                                                                                                                     |                                               |
| <b>History</b>            | 3.1.0000                                                                                                                   |                                               |
| <b>Role</b>               | admin                                                                                                                      |                                               |
| <b>Example</b>            | switch (config)# ib sm root-guid aa:bb:00:11:22:33:44:55<br>switch (config) #                                              |                                               |
| <b>Related Commands</b>   | show ib sm routing-engines                                                                                                 |                                               |
| <b>Note</b>               | The list of root GUIDs are relevant when IB SM is running on the switch, and the routing algorithm is up-down or fat-tree. |                                               |

## ib sm routing-engines

**ib sm routing-engines [dor] [file] [ftree] [lash] [minhop] [none] [updn]**  
**no ib sm routing-engines**

Sets the routing engine of the SM.

The no form of the command sets the routing engine to be “none”. The default SM routing engine is used.

|                           |                                                                                                                                                               |                                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Syntax Description</b> | dor                                                                                                                                                           | Includes “dor” engine in selection of routing engines.     |
|                           | file                                                                                                                                                          | Includes “file” engine in selection of routing engines.    |
|                           | ftree                                                                                                                                                         | Includes “ftree” engine in selection of routing engines.   |
|                           | lash                                                                                                                                                          | Includes “lash” engine in selection of routing engines.    |
|                           | minhop                                                                                                                                                        | Includes “minhop” engine in selection of routing engines.  |
|                           | none                                                                                                                                                          | No routing engines specified; use SM default(s).           |
|                           | updn                                                                                                                                                          | Includes “up/down” engine in selection of routing engines. |
| <b>Default</b>            | None                                                                                                                                                          |                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                                                        |                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                                                      |                                                            |
| <b>Role</b>               | admin                                                                                                                                                         |                                                            |
| <b>Example</b>            | <pre>switch (config) # ib sm routing-engines none switch (config) # show ib sm routing-engines none none switch (config) #</pre>                              |                                                            |
| <b>Related Commands</b>   | show ib sm routing-engines                                                                                                                                    |                                                            |
| <b>Note</b>               | Multiple routing engines can be specified separated by# commas so that specific ordering of routing algorithms will be tried if earlier routing engines fail. |                                                            |

## ib sm sa-key

### ib sm sa-key <SA\_Key>

Sets the SA\_Key 64-bit value used by SA to qualify that a query is “trusted”.

|                           |                                                                                                                                                                 |         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Syntax Description</b> | SA Key                                                                                                                                                          | 64 bit. |
| <b>Default</b>            | 00:00:00:00:00:00:00:01                                                                                                                                         |         |
| <b>Configuration Mode</b> | config                                                                                                                                                          |         |
| <b>History</b>            | 3.1.0000                                                                                                                                                        |         |
| <b>Role</b>               | admin                                                                                                                                                           |         |
| <b>Example</b>            | <pre>switch (config) # ib sm sa-key 5 switch (config) # show ib sm sa-key 00:00:00:00:00:00:00:05 switch (config) #</pre>                                       |         |
| <b>Related Commands</b>   | show ib sm sa-key                                                                                                                                               |         |
| <b>Note</b>               | OpenSM version 3.2.1 and lower used the default value of “1” in host byte order. You may need to change this value to inter-operate with older subnet managers. |         |

## ib sm single-thread

**ib sm single-thread**  
**no ib sm single-thread**

Enables the Subnet Manager to use a single thread to service all requests.  
 The no form of the command enables SA to use multiple service threads.

|                           |                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                |
| <b>Default</b>            | Disable (use multiple service threads).                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                           |
| <b>Role</b>               | admin                                                                                                              |
| <b>Example</b>            | switch (config) # ib sm single-thread<br>switch (config) # show ib sm single-thread<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm single-thread                                                                                           |
| <b>Note</b>               |                                                                                                                    |

## ib sm sm-inactive

**ib sm sm-inactive**  
**no ib sm sm-inactive**

Configures the SM to start in the “inactive” SM state. This option can be used to run a standalone system without the SM/SA function.

The no form of the command configures the SM to start in “init” SM state.

|                           |                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                              |
| <b>Default</b>            | Disable                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                                                           |
| <b>History</b>            | 3.1.0000                                                                                                         |
| <b>Role</b>               | admin                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # ib sm sm-inactive switch (config) # show ib sm sm-inactive enable switch (config) #</pre> |
| <b>Related Commands</b>   | show ib sm sm-inactive                                                                                           |
| <b>Note</b>               |                                                                                                                  |

## ib sm sm-key

**ib sm sm-key <SM\_Key>**

Sets the SM 64-bit SM\_Key.

|                           |                                                                                                                                                                 |        |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>Syntax Description</b> | SM Key                                                                                                                                                          | 64 bit |
| <b>Default</b>            | 00:00:00:00:00:00:00:01                                                                                                                                         |        |
| <b>Configuration Mode</b> | Config                                                                                                                                                          |        |
| <b>History</b>            | 3.1.0000                                                                                                                                                        |        |
| <b>Role</b>               | admin                                                                                                                                                           |        |
| <b>Example</b>            | <pre>switch (config) # ib sm sm-key 00:00:00:00:00:00:00:05 switch (config) # show ib sm sm-key 00:00:00:00:00:00:00:05 switch (config) #</pre>                 |        |
| <b>Related Commands</b>   | show ib sm sm-key                                                                                                                                               |        |
| <b>Note</b>               | OpenSM version 3.2.1 and lower used the default value of “1” in host byte order. You may need to change this value to inter-operate with older subnet managers. |        |

## ib sm sm-priority

**ib sm sm-priority <priority>**

Prioritizes the desired SM compared to other SMs on the fabric.

|                           |                                                                                                                 |                                                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Syntax Description</b> | priority                                                                                                        | Priority 0 is the least important, 15 the most important. |
| <b>Default</b>            | 0                                                                                                               |                                                           |
| <b>Configuration Mode</b> | Config                                                                                                          |                                                           |
| <b>History</b>            | 3.1.0000                                                                                                        |                                                           |
| <b>Role</b>               | admin                                                                                                           |                                                           |
| <b>Example</b>            | <pre>switch (config) # ib sm sm-priority 1 switch (config) # show ib sm sm-priority 1 switch (config) #</pre>   |                                                           |
| <b>Related Commands</b>   | show ib sm sm-priority                                                                                          |                                                           |
| <b>Note</b>               | If two or more active SMs have the same highest priority, the one with the lowest port GUID manages the fabric. |                                                           |

## ib sm sm-sl

**ib sm sm-sl <sm-sl>**

Sets the SM service level for SM/SA communication.

|                           |                                                                                                     |       |
|---------------------------|-----------------------------------------------------------------------------------------------------|-------|
| <b>Syntax Description</b> | sm-sl                                                                                               | 0-15. |
| <b>Default</b>            | 0                                                                                                   |       |
| <b>Configuration Mode</b> | Config                                                                                              |       |
| <b>History</b>            | 3.1.0000                                                                                            |       |
| <b>Role</b>               | admin                                                                                               |       |
| <b>Example</b>            | <pre>switch (config) # ib sm sm-sl 10 switch (config) # show ib sm sm-sl 10 switch (config) #</pre> |       |
| <b>Related Commands</b>   | show ib sm sm-sl                                                                                    |       |
| <b>Note</b>               | Selects the SL that is used for MADs.                                                               |       |



## ib sm sminfo-poll-time

**ib sm sminfo-poll-time <time>**

This variable controls the timeout between two polls of an active subnet manager.

|                           |                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time<br>In milliseconds.                                                                                                             |
| <b>Default</b>            | 10 seconds                                                                                                                           |
| <b>Configuration Mode</b> | Config                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                |
| <b>Example</b>            | switch (config) # ib sm sminfo-poll-time 15<br>switch (config) # show ib sm sminfo-poll-time<br>15 milliseconds<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm sminfo-poll-time                                                                                                          |
| <b>Note</b>               |                                                                                                                                      |

## ib sm subnet-prefix

### ib sm subnet-prefix <prefix>

Sets the SM “Subnet Prefix” used to create scope qualifiers for all elements managed by the SM.

|                           |                                                                                                                                                               |        |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>Syntax Description</b> | prefix                                                                                                                                                        | 64 bit |
| <b>Default</b>            | FE:80:00:00:00:00:00:00                                                                                                                                       |        |
| <b>Configuration Mode</b> | Config                                                                                                                                                        |        |
| <b>History</b>            | 3.1.0000                                                                                                                                                      |        |
| <b>Role</b>               | admin                                                                                                                                                         |        |
| <b>Example</b>            | <pre>switch (config) # ib sm subnet-prefix ff:ff:ff:ff:ff:ff:ff:00 switch (config) # show ib sm subnet-prefix FF:FF:FF:FF:FF:FF:FF:00 switch (config) #</pre> |        |
| <b>Related Commands</b>   | show ib sm subnet-prefix                                                                                                                                      |        |
| <b>Note</b>               | The default value is also the InfiniBand default for a locally administered subnet.                                                                           |        |

## ib sm subnet-timeout

### **ib sm subnet-timeout <time>**

Sets the global per-port subnet timeout value (PortInfo:SubnetTimeOut). This value also controls the maximum trap frequency in which no traps are allowed to be sent faster than the subnet\_timeout value.

|                           |                                                                                                                                      |                                                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                                 | The actual timeout is $4.096 \text{ uS} * 2^{*} \text{<time>}$ . The range of time is 0-31 for this parameter which supports 32 discrete time values between 4 uS and about 2.4 hours. |
| <b>Default</b>            | 0x12 (About 1 second)                                                                                                                |                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                               |                                                                                                                                                                                        |
| <b>History</b>            | 3.1.0000                                                                                                                             |                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                |                                                                                                                                                                                        |
| <b>Example</b>            | <pre>switch (config) # ib sm subnet-timeout 5 switch (config) # show ib sm subnet-timeout 0x5 (About 131 uS) switch (config) #</pre> |                                                                                                                                                                                        |
| <b>Related Commands</b>   | show ib sm subnet-timeout                                                                                                            |                                                                                                                                                                                        |
| <b>Note</b>               | If the SMA generates a sequence of traps, the interval between successive traps should not be smaller than <time>.                   |                                                                                                                                                                                        |

## ib sm sweep-interval

**ib sm sweep-interval <time>**

**no ib sm sweep-interval**

Specifies the time between subnet sweeps.  
The no form of the command disables periodic sweeps.

|                           |                                                                                                                               |                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Syntax Description</b> | time                                                                                                                          | Range: Between 0 and 36000 seconds (0 - disable). |
| <b>Default</b>            | 10 seconds                                                                                                                    |                                                   |
| <b>Configuration Mode</b> | Config                                                                                                                        |                                                   |
| <b>History</b>            | 3.1.0000                                                                                                                      |                                                   |
| <b>Role</b>               | admin                                                                                                                         |                                                   |
| <b>Example</b>            | <pre>switch (config) # ib sm sweep-interval 20 switch (config) # show ib sm sweep-interval 20 seconds switch (config) #</pre> |                                                   |
| <b>Related Commands</b>   | show ib sm sweep-interval                                                                                                     |                                                   |
| <b>Note</b>               |                                                                                                                               |                                                   |

## ib sm sweep-on-trap

**ib sm sweep-on-trap**  
**no ib sm sweep-on-trap**

Enables every TRAP received by the SM to initiate a heavy sweep in addition to the processing required by the TRAP.

The no form of the command enables SM to use a combination of light and heavy sweeps based on the type of TRAP and other internal states.

|                           |                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                               |
| <b>Default</b>            | enable                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                            |
| <b>History</b>            | 3.1.0000                                                                                                                          |
| <b>Role</b>               | admin                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # ib sm sweep-on-trap switch (config) # show ib sm sweep-on-trap enable switch (config) #</pre>              |
| <b>Related Commands</b>   | show ib sm sweep-on-trap                                                                                                          |
| <b>Note</b>               | More than 10 successive identical TRAPs disable the automatic sweep behavior until at least one different TRAP has been received. |

## ib sm transaction-retries

**ib sm transaction-retries <transaction-retries-count>**

Sets the maximum retries for failed transactions.

|                           |                                                                                                                               |                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Syntax Description</b> | transaction-retries-count                                                                                                     | Must be an integer. |
| <b>Default</b>            | 3                                                                                                                             |                     |
| <b>Configuration Mode</b> | Config                                                                                                                        |                     |
| <b>History</b>            | 3.1.0000                                                                                                                      |                     |
| <b>Role</b>               | admin                                                                                                                         |                     |
| <b>Example</b>            | switch (config) # ib sm transaction-retries 10<br>switch (config) # show ib sm transaction-retries<br>10<br>switch (config) # |                     |
| <b>Related Commands</b>   | show ib sm transaction-retries                                                                                                |                     |
| <b>Note</b>               |                                                                                                                               |                     |

## ib sm use-heavy-sweeps

**ib sm use-heavy-sweeps**  
**no ib sm use-heavy-sweeps**

Turns every fabric sweep to a heavy sweep.  
 The no form of the command enables the SM to use a combination of light and heavy sweeps.

|                           |                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                      |
| <b>Default</b>            | disable                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                   |
| <b>History</b>            | 3.1.0000                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                    |
| <b>Example</b>            | switch (config) # ib sm use-heavy-sweeps<br>switch (config) # show ib sm use-heavy-sweeps<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib sm use-heavy-sweeps                                                                                              |
| <b>Note</b>               |                                                                                                                          |

## ib sm use-ucast-cache

**ib sm use-ucast-cache**  
**no ib sm use-ucast-cache**

Enables the SM to use cached routine data (LMC=0 only).  
 The no form of the command disables the SM to use cached routine data.

|                           |                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                    |
| <b>Default</b>            | Disable                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                                               |
| <b>Role</b>               | admin                                                                                                                  |
| <b>Example</b>            | <pre>switch (config) # ib sm use-ucast-cache switch (config) # show ib sm use-ucast-cache true switch (config) #</pre> |
| <b>Related Commands</b>   | show ib sm use-ucast-cache                                                                                             |
| <b>Note</b>               |                                                                                                                        |



## ib sm vl-stalls

### ib sm vl-stalls <count>

Sets the number of sequential frame drops that cause a switch-to-switch port to enter the VLStalled state.

|                           |                                                                                                             |       |
|---------------------------|-------------------------------------------------------------------------------------------------------------|-------|
| <b>Syntax Description</b> | count                                                                                                       | 1-255 |
| <b>Default</b>            | 7                                                                                                           |       |
| <b>Configuration Mode</b> | Config                                                                                                      |       |
| <b>History</b>            | 3.1.0000                                                                                                    |       |
| <b>Role</b>               | admin                                                                                                       |       |
| <b>Example</b>            | <pre>switch (config) # ib sm vl-stalls 10 switch (config) # show ib sm vl-stalls 10 switch (config) #</pre> |       |
| <b>Related Commands</b>   | show ib sm vl-stalls                                                                                        |       |
| <b>Note</b>               |                                                                                                             |       |

## show ib sm

### show ib sm

Displays the SM admin state.

|                           |                                                             |
|---------------------------|-------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                         |
| <b>Default</b>            | N/A                                                         |
| <b>Configuration Mode</b> | Config                                                      |
| <b>History</b>            | 3.1.0000                                                    |
| <b>Role</b>               | admin                                                       |
| <b>Example</b>            | switch (config) # show ib sm<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm                                                       |
| <b>Note</b>               |                                                             |

## show ib sm accum-log-file

### show ib sm accum-log-file

Displays the accum-log-file configuration.

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                        |
| <b>Default</b>            | N/A                                                                        |
| <b>Configuration Mode</b> | Config                                                                     |
| <b>History</b>            | 3.1.0000                                                                   |
| <b>Role</b>               | admin                                                                      |
| <b>Example</b>            | switch (config) # show ib sm accum-log-file<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm accum-log-file                                                       |
| <b>Note</b>               |                                                                            |

## show ib sm babbling-policy

### show ib sm babbling-policy

Displays the ability of the SM to disable babbling ports (i.e., generating frequent traps).

|                           |                                                                              |
|---------------------------|------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                          |
| <b>Default</b>            | N/A                                                                          |
| <b>Configuration Mode</b> | Config                                                                       |
| <b>History</b>            | 3.1.0000                                                                     |
| <b>Role</b>               | admin                                                                        |
| <b>Example</b>            | switch (config) # show ib sm babbling-policy<br>disable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm babbling-policy                                                        |
| <b>Note</b>               |                                                                              |

## show ib sm connect-roots

### show ib sm connect-roots

Displays the IBA compliant multi-stage switch directive.

|                           |                                                                         |
|---------------------------|-------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                     |
| <b>Default</b>            | N/A                                                                     |
| <b>Configuration Mode</b> | Config                                                                  |
| <b>History</b>            | 3.1.0000                                                                |
| <b>Role</b>               | admin                                                                   |
| <b>Example</b>            | switch (config) # show ib sm connect-roots<br>true<br>switch (config) # |
| <b>Related Commands</b>   | ib sm connect-roots                                                     |
| <b>Note</b>               |                                                                         |

## show ib sm enable-quirks

### show ib sm enable-quirks

Displays if the SM uses high risk features and handles HW workarounds.

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                        |
| <b>Default</b>            | N/A                                                                        |
| <b>Configuration Mode</b> | Config                                                                     |
| <b>History</b>            | 3.1.0000                                                                   |
| <b>Role</b>               | admin                                                                      |
| <b>Example</b>            | switch (config) # show ib sm enable-quirks<br>disable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm enable-quirks                                                        |
| <b>Note</b>               |                                                                            |

## show ib sm exit-on-fatal

### show ib sm exit-on-fatal

Displays if the SM exits upon a fatal error.

|                           |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                       |
| <b>Default</b>            | N/A                                                                       |
| <b>Configuration Mode</b> | Config                                                                    |
| <b>History</b>            | 3.1.0000                                                                  |
| <b>Role</b>               | admin                                                                     |
| <b>Example</b>            | switch (config) # show ib sm exit-on-fatal<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm exit-on-fatal                                                       |
| <b>Note</b>               |                                                                           |

## show ib sm fdr10

### show ib sm fdr10

Displays the status of the SM use of FDR10.

|                           |                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                               |
| <b>Default</b>            | N/A                                                                               |
| <b>Configuration Mode</b> | Config                                                                            |
| <b>History</b>            | 3.1.0000                                                                          |
| <b>Role</b>               | admin                                                                             |
| <b>Example</b>            | switch (config) # show ib sm fdr10<br>SM use of fdr10 is off<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                   |
| <b>Note</b>               |                                                                                   |



## show ib sm force-link-speed

### show ib sm force-link-speed

Displays SM behavior for PortInfo:LinkSpeedEnabled parameter on switch ports.

|                           |                                                                                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                        |
| <b>Default</b>            | N/A                                                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                   |
| <b>Role</b>               | admin                                                                                                                      |
| <b>Example</b>            | switch (config) # show ib sm force-link-speed<br>15 (Set to switch PortInfo:LinkSpeedSupported value)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm force-link-speed                                                                                                     |
| <b>Note</b>               |                                                                                                                            |

## show ib sm force-link-speed-ext

### show ib sm force-link-speed-ext

Displays switch ports PortInfo:LinkSpeedExtEnabled value.

|                           |                                                                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                |
| <b>Default</b>            | N/A                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                           |
| <b>Role</b>               | admin                                                                                                                              |
| <b>Example</b>            | <pre>switch (config) # show ib sm force-link-speed-ext 31 (Default: set to PortInfo:LinkSpeedExtSupported) switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                    |
| <b>Note</b>               |                                                                                                                                    |

## show ib sm force-log-flush

### show ib sm force-log-flush

Displays if every log message generated forces the log to be flushed.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | N/A                                                                         |
| <b>Configuration Mode</b> | Config                                                                      |
| <b>History</b>            | 3.1.0000                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config) # show ib sm force-log-flush<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm force-log-flush                                                       |
| <b>Note</b>               |                                                                             |

## show ib sm guid2lid-cache

### show ib sm guid2lid-cache

Displays whether or not the SM honors the cached GUID-to-LID mapping information.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | N/A                                                                         |
| <b>Configuration Mode</b> | Config                                                                      |
| <b>History</b>            | 3.1.0000                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config) # show ib sm guid2lid-cache<br>disable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm guid2-lid-cache                                                       |
| <b>Note</b>               |                                                                             |

## show ib sm honor-partitions

### show ib sm honor-partitions

Displays the partition enforcement settings in the subnet.

|                           |                                                                               |
|---------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                           |
| <b>Default</b>            | N/A                                                                           |
| <b>Configuration Mode</b> | Config                                                                        |
| <b>History</b>            | 3.1.0000                                                                      |
| <b>Role</b>               | admin                                                                         |
| <b>Example</b>            | switch (config) # show ib sm honor-partitions<br>disable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm honor-partitions                                                        |
| <b>Note</b>               |                                                                               |

## show ib sm hoq-lifetime

### show ib sm hoq-lifetime

Displays the maximum time a frame can wait at the head of a switch-to-switch port queue before it is dropped.

|                           |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                     |
| <b>Default</b>            | N/A                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                  |
| <b>History</b>            | 3.1.0000                                                                                |
| <b>Role</b>               | admin                                                                                   |
| <b>Example</b>            | switch (config) # show ib sm hoq-lifetime<br>0x12 (About 1 second)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm hoq-lifetime                                                                      |
| <b>Note</b>               |                                                                                         |

## show ib sm ignore-other-sm

### show ib sm ignore-other-sm

Displays if the rules governing SM elections and attempt to manage the fabric on the node are ignored by the SM.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | N/A                                                                         |
| <b>Configuration Mode</b> | Config                                                                      |
| <b>History</b>            | 3.1.0000                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config) # show ib sm ignore-other-sm<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm ignore-other-sm                                                       |
| <b>Note</b>               |                                                                             |

## show ib sm ipv6-nsm

### show ib sm ipv6-nsm

Displays the consolidation of IPv6 Solicited Node Multicast (SNM) group join requests.

|                           |                                                                      |
|---------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                  |
| <b>Default</b>            | N/A                                                                  |
| <b>Configuration Mode</b> | Config                                                               |
| <b>History</b>            | 3.1.0000                                                             |
| <b>Role</b>               | admin                                                                |
| <b>Example</b>            | switch (config) # show ib sm ipv6-nsm<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm ipv6-nsm                                                       |
| <b>Note</b>               |                                                                      |



## show ib sm lash

**show ib sm lash {do-mesh-analysis | start-vl}**

Display 'lash' routing method parameters.

|                           |                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                               |
| <b>Default</b>            | N/A                                                                               |
| <b>Configuration Mode</b> | Config                                                                            |
| <b>History</b>            | 3.1.0000                                                                          |
| <b>Role</b>               | admin                                                                             |
| <b>Example</b>            | switch (config) # show ib sm lash do-mesh-analysis<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm lash                                                                        |
| <b>Note</b>               |                                                                                   |

## show ib sm leafhoq-lifetime

### show ib sm leafhoq-lifetime

Displays the maximum time a frame can wait at the head of a switch-to-CA\_or\_Router port queue before it is dropped.

|                           |                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                       |
| <b>Default</b>            | N/A                                                                                       |
| <b>Configuration Mode</b> | Config                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                  |
| <b>Role</b>               | admin                                                                                     |
| <b>Example</b>            | switch (config) # show ib sm leafhoq-lifetime<br>0x10 (About 268 mS)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm leafhoq-lifetime                                                                    |
| <b>Note</b>               |                                                                                           |

## show ib sm leafvl-stalls

### show ib sm leafvl-stalls

Displays the number of sequential frame drops that cause a switch-to-CA\_or\_Router port to enter the VLStalled state.

|                           |                                                                      |
|---------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                  |
| <b>Default</b>            | N/A                                                                  |
| <b>Configuration Mode</b> | Config                                                               |
| <b>History</b>            | 3.1.0000                                                             |
| <b>Role</b>               | admin                                                                |
| <b>Example</b>            | switch (config) # show ib sm leafvl-stalls<br>7<br>switch (config) # |
| <b>Related Commands</b>   | ib sm leafvl-stalls                                                  |
| <b>Note</b>               |                                                                      |

## show ib sm lmc

### show ib sm lmc

Displays the LID Mask Control (LMC) value to be used on this subnet.

|                           |                                                              |
|---------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                          |
| <b>Default</b>            | N/A                                                          |
| <b>Configuration Mode</b> | Config                                                       |
| <b>History</b>            | 3.1.0000                                                     |
| <b>Role</b>               | admin                                                        |
| <b>Example</b>            | switch (config) # show ib sm lmc<br>0x0<br>switch (config) # |
| <b>Related Commands</b>   | ib sm lmc                                                    |
| <b>Note</b>               |                                                              |

## show ib sm lmc-esp0

### show ib sm lmc-esp0

Displays whether the LMC for the subnet is also used for Enhanced Switch Port 0 (ib sm lmc-esp0) or if the LMC for ESP0 ports is 0 (no ib sm lmc-esp0).

|                           |                                                                      |
|---------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                  |
| <b>Default</b>            | N/A                                                                  |
| <b>Configuration Mode</b> | Config                                                               |
| <b>History</b>            | 3.1.0000                                                             |
| <b>Role</b>               | admin                                                                |
| <b>Example</b>            | switch (config) # show ib sm lmc-esp0<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm lmc-esp0                                                       |
| <b>Note</b>               |                                                                      |

## show ib sm log

**show ib sm log [continuous] [[not] [matching <reg-expression>]]**

Displays IB SM event logs.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | continuous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Displays IB SM new event log messages as they arrive                        |
|                           | not                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Displays IB SM new event logs that do not match a given regular expression. |
|                           | matching <regular expression>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Displays IB SM event log messages that match a given regular expression.    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                             |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                             |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                             |
| <b>Example</b>            | <pre>switch (config) # show ib sm log Jul 18 12:00:40 165863 [48026660] 0x03 -&gt; OpenSM 3.3.13.MLNX- _20121224_9b362db Jul 18 12:00:40 168685 [48026660] 0x80 -&gt; OpenSM 3.3.13.MLNX- _20121224_9b362db Jul 18 12:00:40 170789 [48026660] 0x02 -&gt; osm_vendor_init: 1000 pending umads specified Jul 18 12:00:40 175696 [48026660] 0x80 -&gt; Entering DISCOVERING state Jul 18 12:00:40 249448 [48026660] 0x02 -&gt; osm_vendor_bind: Binding to port 0x2c903008b0440 Jul 18 12:00:40 293959 [48026660] 0x02 -&gt; osm_vendor_bind: Binding to port 0x2c903008b0440 Jul 18 12:00:40 296921 [48026660] 0x02 -&gt; osm_vendor_bind: Binding to port 0x2c903008b0440 Jul 18 12:00:40 304702 [48026660] 0x02 -&gt; osm_opensm_bind: Setting IS_SM on port 0x0002c903008b0440 Jul 18 12:00:40 399744 [4A85D4B0] 0x80 -&gt; Entering MASTER state  switch (config) #</pre> |                                                                             |
| <b>Related Commands</b>   | show ib sm log-flags                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                             |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |

## show ib sm log-flags

### show ib sm log-flags

Displays what type of messages the SM will log.

|                           |                                                                                  |
|---------------------------|----------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                              |
| <b>Default</b>            | N/A                                                                              |
| <b>Configuration Mode</b> | Config                                                                           |
| <b>History</b>            | 3.1.0000                                                                         |
| <b>Role</b>               | admin                                                                            |
| <b>Example</b>            | switch (config) # show ib sm log-flags<br>0x3 (error, info)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm log-flags                                                                  |
| <b>Note</b>               |                                                                                  |

## show ib sm log-max-size

### show ib sm log-max-size

Displays the maximum size of the log file.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | N/A                                                                         |
| <b>Configuration Mode</b> | Config                                                                      |
| <b>History</b>            | 3.1.0000                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config) # show ib sm log-max-size<br>50 MBytes<br>switch (config) # |
| <b>Related Commands</b>   | is sm log-max-size                                                          |
| <b>Note</b>               |                                                                             |



## show ib sm m-key

### show ib sm m-key

Display MKey value.

|                           |                                                                      |
|---------------------------|----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                  |
| <b>Default</b>            | N/A                                                                  |
| <b>Configuration Mode</b> | Config                                                               |
| <b>History</b>            | 3.1.0000                                                             |
| <b>Role</b>               | admin                                                                |
| <b>Example</b>            | switch (config) # show ib sm m-key<br>50 MBytes<br>switch (config) # |
| <b>Related Commands</b>   | ib sm m-key                                                          |
| <b>Note</b>               |                                                                      |

## show ib sm max-op-vls

### show ib sm max-op-vls

Displays the maximum number of VLs supported on this subnet.

|                           |                                                                    |
|---------------------------|--------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                |
| <b>Default</b>            | N/A                                                                |
| <b>Configuration Mode</b> | Config                                                             |
| <b>History</b>            | 3.1.0000                                                           |
| <b>Role</b>               | admin                                                              |
| <b>Example</b>            | switch (config) # show ib sm max-op-vls<br>15<br>switch (config) # |
| <b>Related Commands</b>   | ib sm max-op-vls                                                   |
| <b>Note</b>               |                                                                    |

## show ib sm max-ports

### show ib sm max-ports

Displays the number of CA ports SM can manage

|                           |                                                                     |
|---------------------------|---------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                 |
| <b>Default</b>            | N/A                                                                 |
| <b>Configuration Mode</b> | Config                                                              |
| <b>History</b>            | 3.1.0000                                                            |
| <b>Role</b>               | admin                                                               |
| <b>Example</b>            | switch (config) # show ib sm max-ports<br>2048<br>switch (config) # |
| <b>Related Commands</b>   | ib sm max-ports                                                     |
| <b>Note</b>               |                                                                     |

## show ib sm max-reply-time

### show ib sm max-reply-time

Displays the maximum time in milliseconds that the SM will wait for a reply before the transaction times out.

|                           |                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                  |
| <b>Default</b>            | N/A                                                                                  |
| <b>Configuration Mode</b> | Config                                                                               |
| <b>History</b>            | 3.1.0000                                                                             |
| <b>Role</b>               | admin                                                                                |
| <b>Example</b>            | switch (config) # show ib sm max-reply-time<br>200 milliseconds<br>switch (config) # |
| <b>Related Commands</b>   | ib sm max-reply-time                                                                 |
| <b>Note</b>               |                                                                                      |

## show ib sm max-reverse-hops

### show ib sm max-reverse-hops

Displays max hops IO node to top switch

|                           |                                                                              |
|---------------------------|------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                          |
| <b>Default</b>            | N/A                                                                          |
| <b>Configuration Mode</b> | Config                                                                       |
| <b>History</b>            | 3.1.0000                                                                     |
| <b>Role</b>               | admin                                                                        |
| <b>Example</b>            | switch (config) # show ib sm max-reverse-hops<br>0 hops<br>switch (config) # |
| <b>Related Commands</b>   | ib sm max-reverse-hops                                                       |
| <b>Note</b>               |                                                                              |

## show ib sm max-smpps-timeout

### show ib sm max-smpps-timeout

Displays timeout for SMPs between max\_wire\_smpps & max\_wire\_smpps2.

|                           |                                                                               |
|---------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                           |
| <b>Default</b>            | N/A                                                                           |
| <b>Configuration Mode</b> | Config                                                                        |
| <b>History</b>            | 3.1.0000                                                                      |
| <b>Role</b>               | admin                                                                         |
| <b>Example</b>            | switch (config) # show ib sm max-smpps-timeout<br>600000<br>switch (config) # |
| <b>Related Commands</b>   |                                                                               |
| <b>Note</b>               |                                                                               |

## show ib sm max-wire-smpps

### show ib sm max-wire-smpps

Displays the maximal number of MADs the SM will have outstanding at one time to count.

|                           |                                                                       |
|---------------------------|-----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                   |
| <b>Default</b>            | N/A                                                                   |
| <b>Configuration Mode</b> | Config                                                                |
| <b>History</b>            | 3.1.0000                                                              |
| <b>Role</b>               | admin                                                                 |
| <b>Example</b>            | switch (config) # show ib sm max-wire-smpps<br>8<br>switch (config) # |
| <b>Related Commands</b>   | ib sm max-wire-smpps                                                  |
| <b>Note</b>               |                                                                       |

## show ib sm max-wire-smpps2

### show ib sm max-wire-smpps2

Displays maximal SM timeout based packets allowed to be outstanding.

|                           |                                                                        |
|---------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                    |
| <b>Default</b>            | N/A                                                                    |
| <b>Configuration Mode</b> | Config                                                                 |
| <b>History</b>            | 3.1.0000                                                               |
| <b>Role</b>               | admin                                                                  |
| <b>Example</b>            | switch (config) # show ib sm max-wire-smpps2<br>4<br>switch (config) # |
| <b>Related Commands</b>   |                                                                        |
| <b>Note</b>               |                                                                        |



## show ib sm mkey-lease

### show ib sm mkey-lease

Display MKey period in seconds.

|                           |                                                                                |
|---------------------------|--------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                            |
| <b>Default</b>            | N/A                                                                            |
| <b>Configuration Mode</b> | Config                                                                         |
| <b>History</b>            | 3.1.0000                                                                       |
| <b>Role</b>               | admin                                                                          |
| <b>Example</b>            | switch (config) # show ib sm mkey-lease<br>0 (No timeout)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm mkey-lease                                                               |
| <b>Note</b>               |                                                                                |

## show ib sm msgfifo-timeout

### show ib sm msgfifo-timeout

Displays the elapsed time in milliseconds before a frame at the head of Subnet Agent queue causes an immediate BUSY state.

|                           |                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                 |
| <b>Default</b>            | N/A                                                                                 |
| <b>Configuration Mode</b> | Config                                                                              |
| <b>History</b>            | 3.1.0000                                                                            |
| <b>Role</b>               | admin                                                                               |
| <b>Example</b>            | switch (config) # show ib sm msgfifo-timeout<br>10.000 seconds<br>switch (config) # |
| <b>Related Commands</b>   | ib sm msgfifo-timeout                                                               |
| <b>Note</b>               |                                                                                     |

## show ib sm multicast

### show ib sm multicast

Displays whether the SM supports multicast on the fabric.

|                           |                                                                       |
|---------------------------|-----------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                   |
| <b>Default</b>            | N/A                                                                   |
| <b>Configuration Mode</b> | Config                                                                |
| <b>History</b>            | 3.1.0000                                                              |
| <b>Role</b>               | admin                                                                 |
| <b>Example</b>            | switch (config) # show ib sm multicast<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm multicast                                                       |
| <b>Note</b>               |                                                                       |

## show ib sm no-client-rereg

### show ib sm no-client-rereg

Displays client re-registration admin state.

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                         |
| <b>Default</b>            | N/A                                                                         |
| <b>Configuration Mode</b> | Config                                                                      |
| <b>History</b>            | 3.1.0000                                                                    |
| <b>Role</b>               | admin                                                                       |
| <b>Example</b>            | switch (config) # show ib sm no-client-rereg<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib no-client-rereg                                                          |
| <b>Note</b>               |                                                                             |

## show ib sm overrun-trigger

### show ib sm overrun-trigger

Displays count of local buffer overrun errors for Infiniband trap 130

|                           |                                                                        |
|---------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                    |
| <b>Default</b>            | N/A                                                                    |
| <b>Configuration Mode</b> | Config                                                                 |
| <b>History</b>            | 3.1.0000                                                               |
| <b>Role</b>               | admin                                                                  |
| <b>Example</b>            | switch (config) # show ib sm overrun-trigger<br>3<br>switch (config) # |
| <b>Related Commands</b>   | ib sm overrun-trigger                                                  |
| <b>Note</b>               |                                                                        |

## show ib sm packet-life-time

### show ib sm packet-life-time

Displays the maximum time a frame can live in a switch.

|                           |                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                   |
| <b>Default</b>            | N/A                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                |
| <b>History</b>            | 3.1.0000                                                                              |
| <b>Role</b>               | admin                                                                                 |
| <b>Example</b>            | switch (config) # show ib sm packet-life-time<br>0x14 (Infinite)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm packet-life-time                                                                |
| <b>Note</b>               |                                                                                       |

## show ib sm phy-err-trigger

### show ib sm phy-err-trigger

Displays the number of local link integrity errors and the port's SMA supports traps.

|                           |                                                                        |
|---------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                    |
| <b>Default</b>            | N/A                                                                    |
| <b>Configuration Mode</b> | Config                                                                 |
| <b>History</b>            | 3.1.0000                                                               |
| <b>Role</b>               | admin                                                                  |
| <b>Example</b>            | switch (config) # show ib sm phy-err-trigger<br>5<br>switch (config) # |
| <b>Related Commands</b>   | ib sm phy-err-trigger                                                  |
| <b>Note</b>               |                                                                        |

## show ib sm polling-retries

### show ib sm polling-retries

Displays the number of consecutive times an active SM must fail to respond before it is declared dead.

|                           |                                                                        |
|---------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                    |
| <b>Default</b>            | N/A                                                                    |
| <b>Configuration Mode</b> | Config                                                                 |
| <b>History</b>            | 3.1.0000                                                               |
| <b>Role</b>               | admin                                                                  |
| <b>Example</b>            | switch (config) # show ib sm polling-retries<br>8<br>switch (config) # |
| <b>Related Commands</b>   | ib sm polling-retries                                                  |
| <b>Note</b>               |                                                                        |



## show ib sm port-prof-switch

### show ib sm port-prof-switch

Displays whether or not the counting of adapters, routers, and switches through the links is being done.

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                        |
| <b>Default</b>            | N/A                                                                        |
| <b>Configuration Mode</b> | Config                                                                     |
| <b>History</b>            | 3.1.0000                                                                   |
| <b>Role</b>               | admin                                                                      |
| <b>Example</b>            | switch (config) # show ib sm port-prof-switch<br>true<br>switch (config) # |
| <b>Related Commands</b>   | ib sm port-prof-switch                                                     |
| <b>Note</b>               |                                                                            |

## show ib sm reassign-lids

### show ib sm reassign-lids

Displays the ability of the SM to reassign LIDs to nodes it finds already configured with a valid LID.

|                           |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                       |
| <b>Default</b>            | N/A                                                                       |
| <b>Configuration Mode</b> | Config                                                                    |
| <b>History</b>            | 3.1.0000                                                                  |
| <b>Role</b>               | admin                                                                     |
| <b>Example</b>            | switch (config) # show ib sm reassign-lids<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm reassign-lids                                                       |
| <b>Note</b>               |                                                                           |

## show ib sm root-guid

### show ib sm root-guid

Displays the configured root GUIDs for the SM.

|                           |                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                  |
| <b>Configuration Mode</b> | Config                                                                                                                               |
| <b>History</b>            | 3.1.0000                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                |
| <b>Example</b>            | <pre>switch (config)# show ib sm root-guid AA:00:11:22:33:44:55 AA:00:11:22:33:44:56 AA:00:11:22:33:44:57 ... switch (config)#</pre> |
| <b>Related Commands</b>   | ib sm routing-engine                                                                                                                 |
| <b>Note</b>               | The list of root GUIDs are relevant when IB SM is running on the switch, and the routing algorithm is up-down or fat-tree.           |

## show ib sm routing-engines

### show ib sm routing-engines

Displays an ordered list of routing engines

|                           |                                                                          |
|---------------------------|--------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                      |
| <b>Default</b>            | N/A                                                                      |
| <b>Configuration Mode</b> | Config                                                                   |
| <b>History</b>            | 3.1.0000                                                                 |
| <b>Role</b>               | admin                                                                    |
| <b>Example</b>            | switch (config) # show ib sm routing-engine<br>none<br>switch (config) # |
| <b>Related Commands</b>   | ib sm routing-engine                                                     |
| <b>Note</b>               |                                                                          |

## show ib sm routing-info

### show ib sm routing-info

Displays current routing engine information.

|                           |                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                             |
| <b>Default</b>            | N/A                                                                                             |
| <b>Configuration Mode</b> | Config                                                                                          |
| <b>History</b>            | 3.1.0000                                                                                        |
| <b>Role</b>               | admin                                                                                           |
| <b>Example</b>            | switch (config) # show ib sm routing-info<br>Current routing engine minhop<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                                 |
| <b>Note</b>               |                                                                                                 |

## show ib sm sa-key

### show ib sm sa-key

Displays the SM sa-key value used by SA to qualify that a query is “trusted”.

|                           |                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                 |
| <b>Default</b>            | N/A                                                                                 |
| <b>Configuration Mode</b> | Config                                                                              |
| <b>History</b>            | 3.1.0000                                                                            |
| <b>Role</b>               | admin                                                                               |
| <b>Example</b>            | switch (config) # show ib sm sa-key<br>00:00:00:00:00:00:00:05<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sa-key                                                                        |
| <b>Note</b>               |                                                                                     |

## show ib sm single-thread

### show ib sm single-thread

Displays if the SM uses a single thread to service all requests.

|                           |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                       |
| <b>Default</b>            | N/A                                                                       |
| <b>Configuration Mode</b> | Config                                                                    |
| <b>History</b>            | 3.1.0000                                                                  |
| <b>Role</b>               | admin                                                                     |
| <b>Example</b>            | switch (config) # show ib sm single-thread<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm single-thread                                                       |
| <b>Note</b>               |                                                                           |

## show ib sm sm-inactive

### show ib sm sm-inactive

Displays whether or not the SM starts in “inactive” rather than “init” SM state.

|                           |                                                                         |
|---------------------------|-------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                     |
| <b>Default</b>            | N/A                                                                     |
| <b>Configuration Mode</b> | Config                                                                  |
| <b>History</b>            | 3.1.0000                                                                |
| <b>Role</b>               | admin                                                                   |
| <b>Example</b>            | switch (config) # show ib sm sm-inactive<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sm-inactive                                                       |
| <b>Note</b>               |                                                                         |



## show ib sm sm-key

### show ib sm sm-key

Displays the SM 64-bit SM\_Key.

|                           |                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                 |
| <b>Default</b>            | N/A                                                                                 |
| <b>Configuration Mode</b> | Config                                                                              |
| <b>History</b>            | 3.1.0000                                                                            |
| <b>Role</b>               | admin                                                                               |
| <b>Example</b>            | switch (config) # show ib sm sm-key<br>00:00:00:00:00:00:00:05<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sm-key                                                                        |
| <b>Note</b>               |                                                                                     |

## show ib sm sm-priority

### show ib sm sm-priority

Displays the importance of this SM compared to other SMs on the fabric.

|                           |                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                         |
| <b>Default</b>            | N/A                                                                                                                                                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                       |
| <b>Example</b>            | switch (config) # show ib sm sm-priority<br>1<br>switch (config) #                                                                                                          |
| <b>Related Commands</b>   | ib sm sm-priority                                                                                                                                                           |
| <b>Note</b>               | Priority 0 is the least important, 15 the most important. If 2 or more active SMs have the same highest priority, the one with the lowest port GUID will manage the fabric. |

## show ib sm sm-sl

### show ib sm sm-sl

Display SL used for SM/SA communication

|                           |                                                              |
|---------------------------|--------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                          |
| <b>Default</b>            | N/A                                                          |
| <b>Configuration Mode</b> | Config                                                       |
| <b>History</b>            | 3.1.0000                                                     |
| <b>Role</b>               | admin                                                        |
| <b>Example</b>            | switch (config) # show ib sm sm-sl<br>1<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sm-sl                                                  |
| <b>Note</b>               |                                                              |

## show ib sm sminfo-poll-time

### show ib sm sminfo-poll-time

Displays the timeout in milliseconds between two polls of an active SM.

|                           |                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                   |
| <b>Default</b>            | N/A                                                                                   |
| <b>Configuration Mode</b> | Config                                                                                |
| <b>History</b>            | 3.1.0000                                                                              |
| <b>Role</b>               | admin                                                                                 |
| <b>Example</b>            | switch (config) # show ib sm sminfo-poll-time<br>15 milliseconds<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sminfo-poll-time                                                                |
| <b>Note</b>               |                                                                                       |

## show ib sm subnet-prefix

### show ib sm subnet-prefix

Displays the SM “Subnet Prefix” used to create scope qualifiers for all elements managed by the SM.

|                           |                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                        |
| <b>Default</b>            | N/A                                                                                        |
| <b>Configuration Mode</b> | Config                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                   |
| <b>Role</b>               | admin                                                                                      |
| <b>Example</b>            | switch (config) # show ib sm subnet-prefix<br>FF:FF:FF:FF:FF:FF:FF:00<br>switch (config) # |
| <b>Related Commands</b>   | ib sm subnet-prefix                                                                        |
| <b>Note</b>               |                                                                                            |

## show ib sm subnet-timeout

### show ib sm subnet-timeout

Displays the global per-port subnet timeout value (PortInfo:SubnetTimeOut). This value also controls the maximum trap frequency in which no traps are allowed to be sent faster than the subnet\_timeout value. The time is  $4.096 \text{ uS} * 2^{\text{time}}$ .

|                           |                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                    |
| <b>Default</b>            | N/A                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                 |
| <b>History</b>            | 3.1.0000                                                                               |
| <b>Role</b>               | admin                                                                                  |
| <b>Example</b>            | switch (config) # show ib sm subnet-timeout<br>0x5 (About 131 uS)<br>switch (config) # |
| <b>Related Commands</b>   | ib sm subnet-timeout                                                                   |
| <b>Note</b>               |                                                                                        |

## show ib sm sweep-interval

### show ib sm sweep-interval

Displays the time in seconds between subnet sweeps.

|                           |                                                                                |
|---------------------------|--------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                            |
| <b>Default</b>            | N/A                                                                            |
| <b>Configuration Mode</b> | Config                                                                         |
| <b>History</b>            | 3.1.0000                                                                       |
| <b>Role</b>               | admin                                                                          |
| <b>Example</b>            | switch (config) # show ib sm sweep-interval<br>20 seconds<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sweep-interval                                                           |
| <b>Note</b>               |                                                                                |

## show ib sm sweep-on-trap

### show ib sm sweep-on-trap

Displays whether or not a heavy sweep is initiated by the TRAP received by the SM.

|                           |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                       |
| <b>Default</b>            | N/A                                                                       |
| <b>Configuration Mode</b> | Config                                                                    |
| <b>History</b>            | 3.1.0000                                                                  |
| <b>Role</b>               | admin                                                                     |
| <b>Example</b>            | switch (config) # show ib sm sweep-on-trap<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm sweep-on-trap                                                       |
| <b>Note</b>               |                                                                           |



## show ib sm transaction-retries

### show ib sm transaction-retries

Displays maximum retries before failing a transaction

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                        |
| <b>Default</b>            | N/A                                                                        |
| <b>Configuration Mode</b> | Config                                                                     |
| <b>History</b>            | 3.1.0000                                                                   |
| <b>Role</b>               | admin                                                                      |
| <b>Example</b>            | switch (config) # show ib sm transaction-retries<br>3<br>switch (config) # |
| <b>Related Commands</b>   | ib sm transaction-retries                                                  |
| <b>Note</b>               |                                                                            |

## show ib sm use-heavy-sweeps

### show ib sm use-heavy-sweeps

Displays SM requirement to always use heavy sweeps.

|                           |                                                                               |
|---------------------------|-------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                           |
| <b>Default</b>            | N/A                                                                           |
| <b>Configuration Mode</b> | Config                                                                        |
| <b>History</b>            | 3.1.0000                                                                      |
| <b>Role</b>               | admin                                                                         |
| <b>Example</b>            | switch (config) # show ib sm use-heavy-sweeps<br>disable<br>switch (config) # |
| <b>Related Commands</b>   | ib sm use-heavy-sweeps                                                        |
| <b>Note</b>               |                                                                               |

## show ib sm use-ucast-cache

### show ib sm use-ucast-cache

Displays if the SM uses cached routine data.

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                        |
| <b>Default</b>            | N/A                                                                        |
| <b>Configuration Mode</b> | Config                                                                     |
| <b>History</b>            | 3.1.0000                                                                   |
| <b>Role</b>               | admin                                                                      |
| <b>Example</b>            | switch (config) # show ib sm use-ucast-cache<br>false<br>switch (config) # |
| <b>Related Commands</b>   | ib sm user-ucase-cache                                                     |
| <b>Note</b>               |                                                                            |

## show ib sm version

### show ib sm version

Displays the open SM version that is currently running.

|                           |                                                                          |
|---------------------------|--------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                      |
| <b>Default</b>            | N/A                                                                      |
| <b>Configuration Mode</b> | Config                                                                   |
| <b>History</b>            | 3.2.3000                                                                 |
| <b>Role</b>               | admin                                                                    |
| <b>Example</b>            | switch (config) # show ib sm version<br>OpenSM3.3.7<br>switch (config) # |
| <b>Related Commands</b>   |                                                                          |
| <b>Note</b>               |                                                                          |

## show ib sm vl-stalls

### show ib sm use-vl-stalls

Displays the number of sequential frame drops that cause a switch-to-switch port to enter the VLStalled state.

|                           |                                                                  |
|---------------------------|------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                              |
| <b>Default</b>            | N/A                                                              |
| <b>Configuration Mode</b> | Config                                                           |
| <b>History</b>            | 3.1.0000                                                         |
| <b>Role</b>               | admin                                                            |
| <b>Example</b>            | switch (config) # show ib sm vl-stalls<br>7<br>switch (config) # |
| <b>Related Commands</b>   | ib sm vl-stalls                                                  |
| <b>Note</b>               |                                                                  |

### 7.4.4.2 Partition (SM)

## ib partition

**ib partition** <partition-name> [pkey <pkey number>]  
**no ib partition** <partition-name>

Enters the context of the partition specified.  
 The no form of the command deletes the partition.

|                           |                                                                                         |                                                          |
|---------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | partition-name                                                                          | Name of partition context to be entered.                 |
|                           | pkey                                                                                    | Creates a partition and enters a new configuration mode. |
| <b>Default</b>            | Default partition is available (PKEY 0x7fff)                                            |                                                          |
| <b>Configuration Mode</b> | Config                                                                                  |                                                          |
| <b>History</b>            | 3.2.0500                                                                                |                                                          |
| <b>Role</b>               | admin                                                                                   |                                                          |
| <b>Example</b>            | switch (config) # ib partition my-partition<br>switch (config partition my-partition) # |                                                          |
| <b>Related Commands</b>   |                                                                                         |                                                          |
| <b>Note</b>               |                                                                                         |                                                          |

## pkey

**pkey <number>**  
**no pkey <number>**

Specifies PKEY number for this partition.  
 The no form of the command removes the PKEY configuration from partitions.conf file.

|                           |                                                                                                                                                      |              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Syntax Description</b> | number                                                                                                                                               | 0x001-0x7fff |
| <b>Default</b>            | N/A                                                                                                                                                  |              |
| <b>Configuration Mode</b> | Config Partition                                                                                                                                     |              |
| <b>History</b>            | 3.2.0500                                                                                                                                             |              |
| <b>Role</b>               | admin                                                                                                                                                |              |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config partition my-partition) # pkey 0x7777 switch (config partition my-partition) #</pre> |              |
| <b>Related Commands</b>   |                                                                                                                                                      |              |
| <b>Note</b>               | PKEY must be unique.                                                                                                                                 |              |

## defmember

**defmember <type>**

**no defmember**

Sets the default membership for port GUID list.

The no form of the command set the defmember configuration to default (it will not appear in the partitions.conf file).

|                           |                                                                                                                                                               |                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                                                                                          | Default membership for GUIDs in this partition: <ul style="list-style-type: none"> <li>• full</li> <li>• limited</li> <li>• both</li> </ul> |
| <b>Default</b>            | limited                                                                                                                                                       |                                                                                                                                             |
| <b>Configuration Mode</b> | Config Partition                                                                                                                                              |                                                                                                                                             |
| <b>History</b>            | 3.2.0500                                                                                                                                                      |                                                                                                                                             |
|                           | 3.4.1100                                                                                                                                                      | Added “both” parameter                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                                         |                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config ib partition my-partition) # defmember full switch (config ib partition my-partition) #</pre> |                                                                                                                                             |
| <b>Related Commands</b>   | <pre>ib sm allow-both-pkeys member</pre>                                                                                                                      |                                                                                                                                             |
| <b>Note</b>               | This parameter can be overwritten for specific GUID, using the “member” command.                                                                              |                                                                                                                                             |



## member

**member** {<guid> | all | self} [type <member-type>]

**no member** {<guid> | all | self} [type]

Adds static members to partition.

The no form of the command will remove the static member from the partition (it will not appear in the partitions.conf file).

|                           |                                                                                                                                                     |                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | guid                                                                                                                                                | The GUID number.                                                                                                                            |
|                           | all   self                                                                                                                                          | The options “all” can be used for all GUIDs in the fabric, or “self” for the switch guide.                                                  |
|                           | member-type                                                                                                                                         | Default membership for GUIDs in this partition: <ul style="list-style-type: none"> <li>• full</li> <li>• limited</li> <li>• both</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                 |                                                                                                                                             |
| <b>Configuration Mode</b> | Config Partition                                                                                                                                    |                                                                                                                                             |
| <b>History</b>            | 3.2.0500                                                                                                                                            |                                                                                                                                             |
|                           | 3.4.1100                                                                                                                                            | Added “both” parameter                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                                               |                                                                                                                                             |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config partition my-partition) # member all switch (config partition my-partition) #</pre> |                                                                                                                                             |
| <b>Related Commands</b>   | ib sm allow-both-pkeys<br>defmember                                                                                                                 |                                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                     |                                                                                                                                             |

## ipoib

**ipoib**  
**no ipoib**

Enables this partition to use IPoIB. As a result IPoIB multicast group will be created. The no form of the command will remove the use of IPoIB in this partition (it will not appear in the partitions.conf file).

|                           |                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                            |
| <b>Default</b>            | no ipoib                                                                                                                                       |
| <b>Configuration Mode</b> | Config Partition                                                                                                                               |
| <b>History</b>            | 3.2.0500                                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config partition my-partition) # ipoib switch (config partition my-partition) #</pre> |
| <b>Related Commands</b>   | rate<br>mtu<br>sl<br>scope                                                                                                                     |
| <b>Note</b>               | “rate”, “mtu”, “sl” and “scope” commands can be used only when the IPoIB parameter is enabled.                                                 |

## mtu

**mtu** <256, 512, 1K, 2K,4K>

**no mtu**

Specifies MTU for this IPoIB multicast group.  
The no form of the command sets the mtu to default (it will not appear in the partitions.conf file).

| Syntax Description        |                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>            | 2K                                                                                                                                              |
| <b>Configuration Mode</b> | Config Partition                                                                                                                                |
| <b>History</b>            | 3.2.0500                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                           |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config partition my-partition) # mtu 4K switch (config partition my-partition) #</pre> |
| <b>Related Commands</b>   | ipoib                                                                                                                                           |
| <b>Note</b>               | IPoIB parameter on the partitions must be enabled in order to use this parameter                                                                |

## rate

**rate <rate>**

**no rate**

Specifies rate for this IPoIB multicast group.  
The no form of the command set the rate to default (removes the rate from the partitions.conf)

|                           |                                                                                                                                                  |                                                                                                                                                                                                                                                                                                 |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | rate                                                                                                                                             | <ul style="list-style-type: none"> <li>• default - Default</li> <li>• 2.5 - 2.5 Gbps</li> <li>• 5 - 5 Gbps</li> <li>• 10 - 10 Gbps</li> <li>• 14 - 14 Gbps</li> <li>• 20 - 20 Gbps</li> <li>• 25 - 25 Gbps</li> <li>• 40 - 40 Gbps</li> <li>• 56 - 56 Gbps</li> <li>• 100 - 100 Gbps</li> </ul> |
| <b>Default</b>            | 10 Gbps.                                                                                                                                         |                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Partition                                                                                                                                 |                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.2.0500                                                                                                                                         |                                                                                                                                                                                                                                                                                                 |
| <b>History</b>            | 3.4.1100                                                                                                                                         | Updated rate Syntax Description                                                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                            |                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config partition my-partition) # rate 20 switch (config partition my-partition) #</pre> |                                                                                                                                                                                                                                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                                  |                                                                                                                                                                                                                                                                                                 |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Ports that do not support the IPoIB rate are not added to the partition</li> </ul>                      |                                                                                                                                                                                                                                                                                                 |

## scope

**scope** <type>

**no scope** <link-local, site-local, organization-local, global>

Specifies scope for this IPoIB multicast group.  
The no form of the command removes the scope configuration from the partitions.conf file

|                           |                                                                                                                                                       |                                                          |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                                                                                  | link-local<br>site-local<br>organization-local<br>global |
| <b>Default</b>            | link-local                                                                                                                                            |                                                          |
| <b>Configuration Mode</b> | Config Partition                                                                                                                                      |                                                          |
| <b>History</b>            | 3.2.0500                                                                                                                                              |                                                          |
| <b>Role</b>               | admin                                                                                                                                                 |                                                          |
| <b>Example</b>            | <pre>switch (config) # ib partition my-partition switch (config partition my-partition) # scope global switch (config partition my-partition) #</pre> |                                                          |
| <b>Related Commands</b>   |                                                                                                                                                       |                                                          |
| <b>Note</b>               | ipoib parameter on the partitions must be enabled in order to use this parameter.                                                                     |                                                          |

## sl

**sl** <0-14, "default">

**no sl**

Specifies SL (Service Level - QoS) for this IPoIB multicast group.  
The no form of the command sets it to default (the sl configuration is removed from the partitions.conf file).

|                           |                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | 0-14                                                                                                                                     |
| <b>Default</b>            | default (0)                                                                                                                              |
| <b>Configuration Mode</b> | Config Partition                                                                                                                         |
| <b>History</b>            | 3.2.0500                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                    |
| <b>Example</b>            | switch (config) # ib partition my-partition<br>switch (config partition my-partition) # sl 7<br>switch (config partition my-partition) # |
| <b>Related Commands</b>   |                                                                                                                                          |
| <b>Note</b>               | ipoib parameter on the partitions must be enabled in order to use this parameter.                                                        |

## show ib partition

**show ib partition [<partition-name> [member [<member-name>]]]**

Shows partition info, with optional to filters.

|                           |                                                                                                                                                                                                                                                                                                                                |                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Syntax Description</b> | partition-name                                                                                                                                                                                                                                                                                                                 | Filter the output per partition name.  |
|                           | member <member-name>                                                                                                                                                                                                                                                                                                           | Filter the output by a specific member |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                               |                                        |
| <b>History</b>            | 3.2.0500                                                                                                                                                                                                                                                                                                                       |                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                          |                                        |
| <b>Example</b>            | <pre>switch (config) # show ib partition  Default PKey = 0x7FFF defmember = full ipoib = yes members GUID='ALL' member='full'  my-partition PKey = Auto-assign defmember = full ipoib = yes rate = 40 mtu = 1K sl = 3 scope = link_local members GUID='ALL' member='default' GUID='SELF' member='full' switch (config) #</pre> |                                        |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                |                                        |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                |                                        |

### 7.4.4.3 Quality of Service (SM)

## ib baseqos <port-type> high-limit

**ib baseqos <port-type> high-limit <count>**

Sets the high-limit value for the indicated port type. Thus the system will send at least  $4096 * \text{<count>}$  bytes from the high priority list before sending any from the low priority list.

|                           |                                                                                                        |                                                                                                                                                                                                                 |
|---------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port-type                                                                                              | <ul style="list-style-type: none"> <li>• ca - channel adapters</li> <li>• rtr - routers</li> <li>• sw0 - ports 0 only of the switches</li> <li>• swe - external ports of the switches</li> </ul>                |
|                           | high-limit                                                                                             | Possible values are: -1...255 <ul style="list-style-type: none"> <li>• -1 - default SM high-limit</li> <li>• 0 - 1 frame</li> <li>• <math>i = 1 \dots 254 - 4K * i</math></li> <li>• 255 - unlimited</li> </ul> |
| <b>Default</b>            | -1 (default SM high-limit).                                                                            |                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config                                                                                                 |                                                                                                                                                                                                                 |
| <b>History</b>            | 3.1.0000                                                                                               |                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                  |                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # ib baseqos ca high-limit 255 switch (config) #</pre>                            |                                                                                                                                                                                                                 |
| <b>Related Commands</b>   | show ib baseqos                                                                                        |                                                                                                                                                                                                                 |
| <b>Note</b>               | A high-limit value of 255 means unlimited, and that makes it possible to starve the low priority list. |                                                                                                                                                                                                                 |



## ib baseqos <port-type> max-vls <value>

**ib baseqos <port-type> max-vls <value>**

Sets the maximum number of VLs for the indicated port type.

|                           |                                                                                                                         |                                                                                                                      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port-type                                                                                                               | ca - channel adapters<br>rtr - routers<br>sw0 - ports 0 only of the switches<br>swe - external ports of the switches |
|                           | value                                                                                                                   | Max VLs range between 1 and 15.                                                                                      |
| <b>Default</b>            | 15                                                                                                                      |                                                                                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                  |                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                                                                                |                                                                                                                      |
| <b>Role</b>               | admin                                                                                                                   |                                                                                                                      |
| <b>Example</b>            | <pre>switch (config) # ib baseqos ca max-vls 15 switch (config) # show ib baseqos ca max-vls 15 switch (config) #</pre> |                                                                                                                      |
| <b>Related Commands</b>   | show ib baseqos                                                                                                         |                                                                                                                      |
| <b>Note</b>               |                                                                                                                         |                                                                                                                      |

## ib baseqos <port-type> sl2vl

**ib baseqos <port-type> sl2vl {sl0 | sl0 sl1 | sl0 sl1 sl2 |...}**

**no ib baseqos <port-type> sl2vl**

Sets a list of up to 16 entries that map the SL entry to an appropriate VL.  
The no form of the command sets the attributes to their default settings.

|                           |                                                                                                                                                                                                                                                       |                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port-type                                                                                                                                                                                                                                             | ca - channel adapters<br>rtr - routers<br>sw0 - ports 0 only of the switches<br>swe - external ports of the switches                |
|                           | sl[i]                                                                                                                                                                                                                                                 | A single vector (1 ... 16 elements), the command line vector determine the SL [0...15] that is mapped to the specified VL [0...15]. |
| <b>Default</b>            | The default mapping is: 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,7                                                                                                                                                                                          |                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                |                                                                                                                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                              |                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                 |                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) #show ib baseqos ca sl2vl 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,7 switch (config) # ib baseqos ca sl2vl 10 10 10 switch (config) # show ib baseqos ca sl2vl 10,10,10,15,15,15,15,15,15,15,15,15,15,15,15,15 switch (config) #</pre> |                                                                                                                                     |
| <b>Related Commands</b>   | show ib baseqos                                                                                                                                                                                                                                       |                                                                                                                                     |
| <b>Note</b>               | Any missing SLs will be mapped to VL15.                                                                                                                                                                                                               |                                                                                                                                     |

## ib baseqos <port-type> vlarb-high <value>

**ib baseqos <port-type> vlarb-high {VW1 | VW1 VW2 | ...}**

**no ib baseqos <port-type> vlarb-high**

Sets up to 15 VL to Weight mapping pairs for high priority processing.  
The no form of the command sets the attributes to their default settings.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                    |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port-type                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ca - channel adapters<br>rtr - routers<br>sw0 - ports 0 only of the switches<br>swe - external ports of the switches                                                                                                                                                               |
|                           | VW[i]                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | There are two possible options for this parameter: <ul style="list-style-type: none"> <li>A single vector (1 ...15) in the format of “#: #” separated by spaces, see example below.</li> <li>Format of “i#=X:Y” in order to change a specific entry (see example below)</li> </ul> |
| <b>Default</b>            | The default mapping is:<br>0:4,1:0,2:0,3:0,4:0,5:0,6:0,7:0,8:0,9:0,10:0,11:0,12:0,13:0,14:0                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config) #show ib baseqos ca vlarb-high 0:4,1:0,2:0,3:0,4:0,5:0,6:0,7:0,8:0,9:0,10:0,11:0,12:0,13:0,14:0 switch (config) # ib baseqos ca vlarb-high 0:10 1:10 switch (config) # show ib baseqos ca vlarb-high 0:10,1:10,2:0,3:0,4:0,5:0,6:0,7:0,8:0,9:0,10:0,11:0,12:0,13:0,14:0 switch (config) # ib baseqos sw0 vlarb-high i2=4:3 switch (config) # show ib baseqos sw0 vlarb-high 0:10,1:10,4:3,3:0,4:0,5:0,6:0,7:0,8:0,9:0,10:0,11:0,12:0,13:0,14:0</pre> |                                                                                                                                                                                                                                                                                    |
| <b>Related Commands</b>   | show ib baseqos                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Unspecified elements will be filled with (index:0)</li> <li>You may have multiple entries with the same VL on this list.</li> </ul>                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                    |

## ib baseqos <port-type> vlarb-low <value>

**ib baseqos <port-type> vlarb-low {VW1 | VW1 VW2 | ...}**

**no ib baseqos <port-type> vlarb-low**

Sets up to 15 VL to Weight mapping pairs for low priority processing.  
The no form of the command sets the attributes to their default settings.

|                           |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                    |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port-type                                                                                                                                                                                                                                                                                                                                                                                   | ca - channel adapters<br>rtr - routers<br>sw0 - ports 0 only of the switches<br>swe - external ports of the switches                                                                                                                                                               |
|                           | VW[i]                                                                                                                                                                                                                                                                                                                                                                                       | There are two possible options for this parameter: <ul style="list-style-type: none"> <li>A single vector (1 ...15) in the format of “#: #” separated by spaces, see example below.</li> <li>Format of “i#=X:Y” in order to change a specific entry (see example below)</li> </ul> |
| <b>Default</b>            | The default mapping is:<br>0:0,1:4,2:4,3:4,4:4,5:4,6:4,7:4,8:4,9:4,10:4,11:4,12:4,13:4,14:4                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                    |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                    |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                    |
| <b>Example</b>            | <pre>switch (config) # ib baseqos sw0 vlarb-low 1:1 switch (config) # show ib baseqos sw0 vlarb-low 1:1, 1:0, 2:0, 3:0, 4:0, 5:0, 6:0, 7:0, 8:0, 9:0, 10:0, 11:0, 12:0, 13:0, 14:0 switch (config) # ib baseqos sw0 vlarb-low i2=4:3 switch (config) # show ib baseqos sw0 vlarb-low 1:1, 1:0, 4:3, 3:0, 4:0, 5:0, 6:0, 7:0, 8:0, 9:0, 10:0, 11:0, 12:0, 13:0, 14:0 switch (config) #</pre> |                                                                                                                                                                                                                                                                                    |
| <b>Related Commands</b>   | show ib baseqos                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                    |
| <b>Note</b>               | You may have multiple entries with the same VL on this list.                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                    |

## ib baseqos reset-config

### ib baseqos reset-config

Resets all basic QoS configuration options to defaults.

|                           |                                                                |
|---------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                            |
| <b>Default</b>            | N/A                                                            |
| <b>Configuration Mode</b> | Config                                                         |
| <b>History</b>            | 3.1.0000                                                       |
| <b>Role</b>               | admin                                                          |
| <b>Example</b>            | switch (config) # ib baseqos reset-config<br>switch (config) # |
| <b>Related Commands</b>   |                                                                |
| <b>Note</b>               |                                                                |

## show ib baseqos

**show ib baseqos <port-type> <baseqos-parameters>**

Displays the base ib QoS configuration.

|                           |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | port-type                                                                      | <ul style="list-style-type: none"> <li>• ca - channel adapters</li> <li>• rtr - routers</li> <li>• sw0 - ports 0 only of the switches</li> <li>• swe - external ports of the switches</li> </ul>                                                                                                                                                                                                                         |
|                           | baseqos-parameters                                                             | Possible values are: <ul style="list-style-type: none"> <li>• high-limit - Display high limit (how many high pri before low)</li> <li>• max-vls - Display maximum number of VLs supported on CAs in subnet</li> <li>• sl2vl - Display current SL-to-VL mapping vector</li> <li>• vlarb-high - Display current high priority VL arbitration</li> <li>• vlarb-low - Display current low priority VL arbitration</li> </ul> |
| <b>Default</b>            | N/A                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Config                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.0000                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Role</b>               | admin                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Example</b>            | <pre>switch (config) # show ib baseqos ca high-limit 0 switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Commands</b>   |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Note</b>               |                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                          |

## ib qos

**ib qos**  
**no ib qos**

Enables advanced QoS management on this node  
 The no form of the command disables advance QoS on this node.

|                           |                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                      |
| <b>Default</b>            | advance qos is disabled.                                                                 |
| <b>Configuration Mode</b> | Config                                                                                   |
| <b>History</b>            | 3.1.0000                                                                                 |
| <b>Role</b>               | admin                                                                                    |
| <b>Example</b>            | switch (config) # ib qos<br>switch (config) # show ib qos<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib qos                                                                              |
| <b>Note</b>               |                                                                                          |

## ib qos level

**ib qos level** {<name> | default} {mtu-limit <mtu> | packet-life <time> | pkey <number> | rate-limit <rate-value> | sl <sl-value> | use <description>}  
**no ib qos level** {<name> | default} {mtu-limit | packet-life | pkey | rate-limit | sl | use}

Specifies a QoS level <name> or “default” parameters.  
 The no form of the command set the parameters to default.

|                           |                                                                                                                                                  |                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <name>   default                                                                                                                                 | Specify a name for this qos group, or use the “default” for the default qos parameters.                                                                                                                      |
|                           | mtu-limit <mtu>                                                                                                                                  | MTU in bytes.<br>Possible values are: 1k, 256, 2k, 4k, 512                                                                                                                                                   |
|                           | packet-life <time>                                                                                                                               | Time a packet can wait in switch egress queue before being dropped. The bytes from 4 microsecond up to 2 seconds or infinite.<br>Possible values are 0-20<br>0 - 4usec<br>1 - 8usec<br>...<br>20 - unlimited |
|                           | pkey <number>                                                                                                                                    | PKEY value: ranges between -1 and 32767 (hex 0x7fff)                                                                                                                                                         |
|                           | rate-limit <rate-value>                                                                                                                          | Manages rate limits for QoS Policy levels.<br>Possible values are (in Gbps): default, 2.5, 5, 10, 14, 20, 25, 40, 56, 100.                                                                                   |
|                           | sl <sl-value>                                                                                                                                    | Manages service level for QoS Policy levels.<br>Range: 0-15.                                                                                                                                                 |
|                           | use <description>                                                                                                                                | Specify usage description for this QoS level                                                                                                                                                                 |
|                           |                                                                                                                                                  |                                                                                                                                                                                                              |
| <b>Default</b>            | The default values are:<br>use = “default QoS Level”<br>sl = 0<br>mtu-limit = default<br>rate-limit = default<br>packet-life = 0x12<br>pkey = -1 |                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                           |                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                         |                                                                                                                                                                                                              |
|                           | 3.4.1100                                                                                                                                         | Updated description of “rate-limit” parameter                                                                                                                                                                |
| <b>Role</b>               | admin                                                                                                                                            |                                                                                                                                                                                                              |



---

**Example**

```
switch (config) # ib qos level my-qos-group mtu-limit 2K
switch (config) # show ib qos my-qos-group
my-qos-group:
 use = default QoS Level
 sl = 0
 mtu-limit = 2K
 rate-limit = default
 packet-life = 0x12
 pkey = -1
switch (config) #
```

---

**Related Commands**

show ib qos

---

**Note**

---

## ib qos match-rule

**ib qos match-rule** <rule-index> { {destination | source} <string> | {pkey | qos-class | service-id} <index> {first | last} <value>} | qos-level-name <name>| use <description>}

**no ib qos match-rule** <rule-index> { {destination | source} | {pkey | qos-class | service-id} <index> {first | last} } | qos-level-name | use }

Manages QoS Policy match rules.

The no form of the command set the QoS match-rule to default.

|                           |                                                                                                                                                                                                           |                                                                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Syntax Description</b> | rule-index                                                                                                                                                                                                | Index of this match-rule.<br>Possible range is: 0-4294967295   |
|                           | destination   source<br><string>                                                                                                                                                                          | Manages destination or source for QoS Policy match rules.      |
|                           | pkey   qos-class   service-id<br><index>                                                                                                                                                                  | Manages values for QoS Policy match rules.                     |
|                           | {first   last} <value>                                                                                                                                                                                    | First or last value range (per PKEY / qos-class of service id. |
|                           | qos-level-name <name>                                                                                                                                                                                     | Name for the QoS level                                         |
|                           | use <description>                                                                                                                                                                                         | Specify usage description for this QoS level                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                       |                                                                |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                    |                                                                |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                  |                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                     |                                                                |
| <b>Example</b>            | <pre>switch (config) # ib qos match-rule 10 use my-use switch (config) # show ib qos match-rule 10 match-rule/10: match-rules: use = my-use match-rules: qos-level-name = DEFAULT switch (config) #</pre> |                                                                |
| <b>Related Commands</b>   | show ib qos                                                                                                                                                                                               |                                                                |
| <b>Note</b>               |                                                                                                                                                                                                           |                                                                |

## ib qos port-group

**ib qos port-group** <name> {node-type <index> type <node-type> | partition <name> | pkey <number> | port-guid <index> {first | last} <value> | port-name <index> name <name-value> | use <description>}

**no ib qos port-group** <name> {node-type <index> type | partition | pkey | port-guid <index> {first | last} | port-name <index> name | use }

Manages QoS Policy port groups.

The no form of the command removes a QoS port-group.

|                           |                                                                                                                                                                                                           |                                              |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Syntax Description</b> | <name>                                                                                                                                                                                                    | Port group name                              |
|                           | node-type <index>                                                                                                                                                                                         | Node type index                              |
|                           | type <node-type>                                                                                                                                                                                          | A node type for this port group              |
|                           | partition <name>                                                                                                                                                                                          | A Partition name                             |
|                           | pkey <number>                                                                                                                                                                                             | A PKEY number                                |
|                           | port-guid <index> {first   last} <value>                                                                                                                                                                  | Port-guid range                              |
|                           | port-name <index> name <name-value>                                                                                                                                                                       | Port index name                              |
|                           | use <description>                                                                                                                                                                                         | Specify usage description for this QoS level |
| <b>Default</b>            | N/A                                                                                                                                                                                                       |                                              |
| <b>Configuration Mode</b> | config                                                                                                                                                                                                    |                                              |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                  |                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                     |                                              |
| <b>Example</b>            | <pre>switch (config)# ib qos port-group my-group use my-use switch (config)# show ib qos port-group my-group port-group/my-group: port-groups: pkey = -1 port-groups: use = my-use switch (config)#</pre> |                                              |
| <b>Related Commands</b>   | show ib qos                                                                                                                                                                                               |                                              |
| <b>Note</b>               |                                                                                                                                                                                                           |                                              |

## ib qos ulp any

**ib qos ulp any {pkey | service-id | target-port-guid <index> {first | last | sl} <value> | sl <sl-value>}**

**no ib qos ulp any {pkey | service-id | target-port-guid <index> {first | last | sl} | sl}**

Configures ULP any attributes.

The no form of the command deletes ULP any attributes.

|                           |                                                                    |                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | pkey <index>                                                       | Manages ULP default PKEY assignment.                                                                                                                           |
|                           | service-id <index>                                                 | Manages default ULP Service ID match rule.                                                                                                                     |
|                           | target-port-guid <index>                                           | Manages ULP default target port GUID rule.                                                                                                                     |
|                           | first   last   sl <value>                                          | <ul style="list-style-type: none"> <li>first - first value in range</li> <li>last - last value n range</li> <li>sl - Service level for the ULP rule</li> </ul> |
|                           | sl <sl-value>                                                      | Sets default SL.                                                                                                                                               |
| <b>Default</b>            | N/A                                                                |                                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                             |                                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                           |                                                                                                                                                                |
| <b>Role</b>               | admin                                                              |                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # ib qos ulp any sl 2 switch (config) #</pre> |                                                                                                                                                                |
| <b>Related Commands</b>   | show ib qos                                                        |                                                                                                                                                                |
| <b>Note</b>               |                                                                    |                                                                                                                                                                |

## ib qos ulp ipoib

**ib qos ulp ipoib {default sl <sl-value>| pkey <index> {first | last | sl} <value> }**  
**no ib qos ulp ipoib {default sl | pkey <index>}**

Manages ULP IPoIB settings.  
 The no form of the command deletes IPoIB settings.

|                           |                                                                      |                                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | <b>default sl &lt;sl-value&gt;</b>                                   | Set the default sl. Range 1-15                                                                                                                                       |
|                           | <b>pkey &lt;index&gt;</b>                                            | Manages ULP default PKEY assignment.                                                                                                                                 |
|                           | <b>first   last   sl &lt;value&gt;</b>                               | <ul style="list-style-type: none"> <li>• first - first value in range</li> <li>• last - last value n range</li> <li>• sl - Service level for the ULP rule</li> </ul> |
|                           |                                                                      |                                                                                                                                                                      |
| <b>Default</b>            | N/A                                                                  |                                                                                                                                                                      |
| <b>Configuration Mode</b> | config                                                               |                                                                                                                                                                      |
| <b>History</b>            | 3.1.0000                                                             |                                                                                                                                                                      |
| <b>Role</b>               | admin                                                                |                                                                                                                                                                      |
| <b>Example</b>            | switch (config) # ib qos ulp ipoib default sl 5<br>switch (config) # |                                                                                                                                                                      |
| <b>Related Commands</b>   | show ib qos                                                          |                                                                                                                                                                      |
| <b>Note</b>               |                                                                      |                                                                                                                                                                      |

## ib qos ulp <protocol-type>

**ib qos ulp <protocol-type> {default sl <sl-value> | port-num< index> <first | last | sl> <value>}**

**no ib qos ulp iser {default <sl> | port-num1 <first | last | sl>}**

Configures ULP IScsi Extensions for RDMA, Reliable Datagram Sockets or Sockets Direct Protocol attributes.

The no form of the command deletes all rules.

|                           |                                                                             |                                                                                                                                                |
|---------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | protocol-type                                                               | iser - Scsi Extensions for RDMA<br>rds - Reliable Datagram Sockets<br>sdp - Sockets Direct Protocol                                            |
|                           | default sl <sl-value>                                                       | Set the default sl. Range 1-15                                                                                                                 |
|                           | port-num< index>                                                            | Port number index                                                                                                                              |
|                           | first   last   sl                                                           | <ul style="list-style-type: none"> <li>first - First in range</li> <li>last - in range</li> <li>sl - Service level for the ULP rule</li> </ul> |
| <b>Default</b>            | N/A                                                                         |                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                      |                                                                                                                                                |
| <b>History</b>            | 3.1.0000                                                                    |                                                                                                                                                |
| <b>Role</b>               | admin                                                                       |                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # ib qos ulp iser default sl 2 switch (config) #</pre> |                                                                                                                                                |
| <b>Related Commands</b>   | show ib qos                                                                 |                                                                                                                                                |
| <b>Note</b>               |                                                                             |                                                                                                                                                |

## ib qos ulp srp

**ib qos ulp srp target-port-guid <index> <first | last | sl> <value>**  
**no ib qos ulp srp target-port-guid <index>**

Configures Scsi Rdma Protocol attributes  
 The no form of the command deletes the rules.

| Syntax Description | target-port-guid <index>                                                              | the index of the target port guid.                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | first   last   sl                                                                     | <ul style="list-style-type: none"> <li>• first - First in range</li> <li>• last - in range</li> <li>• sl - Service level for the ULP rule</li> </ul> |
| Default            | N/A                                                                                   |                                                                                                                                                      |
| Configuration Mode | Config                                                                                |                                                                                                                                                      |
| History            | 3.1.0000                                                                              |                                                                                                                                                      |
| Role               | admin                                                                                 |                                                                                                                                                      |
| Example            | <pre>switch (config) # ib qos ulp srp target-port-guid 1 sl 2 switch (config) #</pre> |                                                                                                                                                      |
| Related Commands   | show ib qos                                                                           |                                                                                                                                                      |
| Note               |                                                                                       |                                                                                                                                                      |

## show ib qos

**show ib qos [level | match-rule | port-group | ulp]**

shows the ib QoS configurations

|                           |                                                                                                                                                                                                                               |                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Syntax Description</b> | <b>level</b>                                                                                                                                                                                                                  | shows qos level configurations      |
|                           | match-rule                                                                                                                                                                                                                    | shows qos match-rule configurations |
|                           | port-group                                                                                                                                                                                                                    | shows qos port-group configurations |
|                           | ulp                                                                                                                                                                                                                           | show qos ulp configurations         |
| <b>Default</b>            | N/A                                                                                                                                                                                                                           |                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                        |                                     |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                      |                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                         |                                     |
| <b>Example</b>            | <pre>switch (config) # show ib qos level my-qos-level my-qos-level:   use          = my-use   sl           = 0   mtu-limit    = 2K   rate-limit   = default   packet-life  = 0x12   pkey         = -1 switch (config) #</pre> |                                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                               |                                     |
| <b>Note</b>               |                                                                                                                                                                                                                               |                                     |



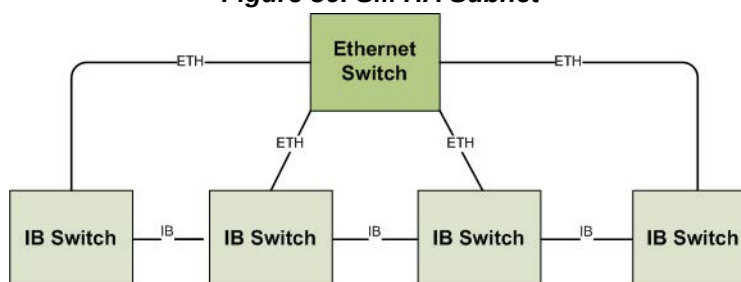
## 7.5 Subnet Manager (SM) High Availability (HA)



All nodes in an SM HA subnet must be of the same CPU type (i.e. PPC or x86).

High availability (HA) refers to a system or component that is continuously operational for a desirably extended period of time. The following sections introduce two types of high availability.

**Figure 36: SM HA Subnet**



All the systems in an InfiniBand subnet must be connected to the same Ethernet subnet to enable data synchronization through the mgmt0 interface.

Mellanox Subnet Manager (SM) HA reduces subnet downtime and disruption as it is continuously operational for a desirably long length of time. It assures continuity of the work even when one of the SMs dies. The database is synchronised with all the nodes participating in the InfiniBand subnet and a configuration change is prepared. The synchronization is done out-of-band using an Ethernet management network.

Mellanox SM HA allows the systems' manager to enter and modify all InfiniBand SM configuration of different subnet managers from a single location. It creates an InfiniBand subnet and associates all the Mellanox management appliances that are attached to the same InfiniBand subnet into that InfiniBand subnet ID. All subnet managers can be controlled, started, or stopped from this address.

All the nodes that participate in the Mellanox SM HA are joined to the InfiniBand subnet ID and once joined, the synchronized SMs are launched. One of the nodes is elected as Master and the others are Slaves (or down). Mellanox SM HA uses an IP address (VIP) that is always directed to the SM HA master to monitor the SM state and to verify that all configurations are executed.

### 7.5.1 Joining, Creating or Leaving an InfiniBand Subnet ID



When transitioning from standalone into a group or vice versa, a few seconds are required for the node state to stabilize. During that time, group features such as Gateway HA, SM HA, and MLAG commands should not be executed. To run group features, wait for the CLI prompt to turn into [standalone:master], [<group>:master] or [<group>:standby] instead of [standalone:\*unknown\*] or [<group>:\*unknown\*].

An InfiniBand subnet is formed by a network of InfiniBand nodes interconnected via InfiniBand switches. It includes all systems that can run an SM and is part of the SM HA domain. A switch

that can potentially run an SM must be a member of an InfiniBand subnet ID to be associated with the Mellanox SM HA domain. An IB subnet is recognized by its ID which is used by the system to either join or leave the subnet.

Every system that is not associated to an existing IB subnet (has never been part of an IB subnet or has left an existing one) or does not have MLNX-OS SwitchX license installed, is by default associated to a subnet called “Standalone”.

In order to create, join or leave an InfiniBand subnet, one may use the following commands:

- Create – “ib ha <IB\_subnet\_ID> ip <ip\_addr> <netmask>”
- Join – “ib ha <IB\_subnet\_ID>”
- Leave – “no ib ha”

For further information see [Section 7.5.5, “Creating and Adding Systems to an InfiniBand Subnet ID,” on page 1155](#).

### 7.5.2 MLNX-OS Management Centralized Location

MLNX-OS centralized management infrastructure enables the user to configure or modify an existing configuration and monitor the subnet running status. MLNX-OS centralized management IP (VIP) is defined when a new subnet manager is created by running the command `ib ha <IB_subnet_ID> ip <ip_addr> <netmask>`. The created VIP is used as the current subnet master’s alias thus, assumes the same roles as the master.

The VIP always points to one of the systems part of the SM HA domain. It is always active even if one or more of the members are down. For example:

```
switch [standalone: master] (config) # ib ha subnet2 ip 192.168.10.110
255.255.255.0
switch [subnet2: master] (config) #
```

### 7.5.3 High Availability Node Roles

A node is an InfiniBand switch system. Every node member of an IB subnet ID has one of the following roles:

- Master - the node that manages SM configurations and provides services to the Virtual IP (VIP) addresses
- Standby - the node that replaces the Master node and takes over its responsibilities once the Master node is down
- Offline - has run an SM in the past and is currently Offline, or it was created manually by the “ib smnode <node name> create” command. If the node has been removed from the environment, you can remove it from the list with the “no ib smnode xxx” command.

➤ **To see the mode of the current node, look at the CLI prompt for the following format:**

```
<host name> [<subnet ID>:<mode>] [standalone: master] (config) #
```

For example:

```
switch [ibstandalone: master] (config) #
```

To see a list of the existing nodes and details about the running state, run the command `show ib smnodes {brief}`.

## 7.5.4 Configuring MLNX-OS SM HA Centralized Location

The IP is used to configure or modify the existing configuration and monitor the subnet running status.

### ➤ *To configure the IP:*

**Step 1.** Enter config mode. Run:

```
switch [standalone: master] >
switch [standalone: master] > enable
switch [standalone: master] # configure terminal
```

**Step 2.** Configure your IP using the `ib ha <IB_subnet_ID> ip <ip_addr> <netmask>` command.

```
switch [standalone: master] (config) # ib ha subnet2 ip 192.168.10.110 255.255.255.0
switch [subnet2: master] (config) #
```

## 7.5.5 Creating and Adding Systems to an InfiniBand Subnet ID

### ➤ *To create and add systems to a subnet:*

**Step 1.** Log into the system from where you are creating the subnet.

**Step 2.** Enter config mode. Run:

```
switch [standalone: master] >
switch [standalone: master] > enable
switch [standalone: master] # configure terminal
```

**Step 3.** Create a new subnet using the `ib ha <IB_subnet_ID> ip <ip_addr> <netmask>` command.

```
switch [standalone: master] (config) # ib ha subnet2 ip 192.168.10.110 255.255.255.0
switch [subnet2: master] (config) #
```



You must run the `ib ha <IB_subnet_ID> ip <ip_addr> <netmask>` command **only once** per subnet ID.

**Step 4.** Log into the system that you are going to join to the new created subnet.

**Step 5.** Join the system to the subnet, using the `ib ha <IB_subnet_ID>` command.

```
switch [standalone: master] (config) # ib ha subnet2
switch [subnet2: standby] (config) #
```

## 7.5.6 Restoring Subnet Manager Configuration

In cases where the Subnet Manager configuration becomes corrupted or the subnet manager cannot raise any logical links it is suggested that you restore the default SM configuration.

### ➤ *To restore subnet manager configuration:*

**Step 1.** Enter config mode. Run:

```
switch [subnet2: master] > enable
switch [subnet2: master] # configure terminal
switch [subnet2: master] (config) #
```

**Step 2.** Run the command `ib sm reset-config`.

```
switch [subnet2: master] (config) # ib sm reset-config
```

Example:

```
switch-11a15e [SX: master] (config) # show ib smnodes brief
```

```
HA state of the switch
```

```
=====
```

```
IB Subnet HA name: SX
```

```
HA IP address: 172.30.0.12/24
```

```
Active HA nodes: 2
```

```
IDSM-HA state IPSMPriority
```

```

```

```
*switch-11a15emaster 172.30.0.10enabled - master0
```

```
switch-1133f6standby 172.30.0.11enabled2
```

```
switch-11a15e [SX: master] (config) # show ib smnodes
```

```
HA state of the switch
```

```
=====
```

```
IB Subnet HA name: SX
```

```
HA IP address: 172.30.0.12/24
```

```
Active HA nodes: 2
```

```
HA node local information
```

```
Name: switch-11a15e (active) <--- (local node)
```

```
SM-HA state: master
```

```
SM Licensed: yes
```

```
SM Running: running
```

```
SM Enabled: enabled - master
```

```
SM Priority: 0
```

```
IP: 172.30.0.10
```

```
HA node local information
```

```
Name: switch-1133f6 (active)
```

```
SM-HA state: standby
```

```
SM Licensed: yes
```

```
SM Running: stopped
```

```
SM Enabled: enabled
```

```
SM Priority: 2
```

```
IP: 172.30.0.11
```

```
switch-11a15e [SX: master] (config) #
```



The asterisk in the example above (**\*switch-11a15e**) indicates the local system from where the command is running.

In order to receive information on the running state of a specific node one could run one of the following commands with its requested parameter:

- `show ib smnode <name> sm-licensed`
- `show ib smnode <name> sm-running`
- `show ib smnode <name> sm-state`
- `show ib smnode <name> sm-priority`
- `show ib smnode <name> active`
- `show ib smnode <name> ha-state`
- `show ib smnode <name> ha-role`

### 7.5.6.1 Subnet Manager Configuration

To configure the subnet manager, log into the centralized management IP (VIP). Once the SM configuration is created, the SM database is duplicated to the other nodes.



The SM **must** be configured from MLNX-OS centralized management IP (VIP). All the configurations that are not created or modified in the master node (using the VIP) are overridden by the master configuration.

The user can configure different SM parameters such as where to run the SM(s) or the SM priority by running the commands according to the desired action.

### 7.5.6.2 Mellanox High Availability and Opensm Handover/Failover



Mellanox Technologies products are fully compliant and interoperable with OpenSM.

Once an SM fails, the SM which takes over the subnet needs to reproduce the internal state of the failed master. Most of the information required is obtained by scanning the subnet and extracting the information from the devices. However, some information which is not stored directly in the network devices cannot be reproduced this way. InfiniBand management architecture limits such information to data exchanged between clients (either user-level programs or kernel modules) and the Subnet Administration (SA) service (attached to the SM). The SA keeps this set of client registrations in an internal data structure called SA-DB. The SA-DB information includes the multicast groups, the multicast group members, subscriptions for event forwarding and service records.

The new SM may retrieve the SA-DB by requesting the clients to re-register with the SA or by obtaining a copy of the previous master SM internal SA-DB via an SA-DB dump file. The client-re-registration offers database correctness and the SA-DB dump file replication provides lower setup time. Client re-registration is required since the SA-DB may not be up-to-date on the registrations listed in the master SM.

Furthermore, since the SM does not maintain SA-DB information for unknown nodes, it is very possible that some of the SA-DB information relating to nodes momentarily disconnected from the master SM become purged. Therefore, these nodes must re-register with the new SM when they are reconnected (they receive a client-re-register request from the SM). Relying only on client re-registration is also non-optimal as it takes some time to recreate the entire SA-DB and the network state.

Mellanox SM HA replicates the SA-DB dump file from the current master SM to all the standby SMs running on Mellanox switches. The SA-DB dump file replication provides further optimization to the standby SM that becomes master.

Standby SM loads the existing SA-DB file the old master has used. By using the existing SA-DB the amount of processing needed on client re-registration is lessened resulting in a reduced time to complete setting up the network.



SM HA does not replace InfiniBand spec requirement for client reregistration.

## 7.5.7 Commands

### ib ha

**ib ha <IB\_subnet\_ID> [ip <IP address> <subnet mask> [force]]**  
**no ib ha**

Creates a subnet <IB\_subnet\_ID> with the specified IP.  
 The no form of the command removes this node from an InfiniBand subnet ID.

|                           |                                                                                                                                                                                                                                                                                       |                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Syntax Description</b> | IB subnet ID                                                                                                                                                                                                                                                                          | Simple group name for shared IB config. |
|                           | ip <IP address>                                                                                                                                                                                                                                                                       | Assigns management IP address.          |
|                           | netmask                                                                                                                                                                                                                                                                               | Netmask: e.g. 255.255.255.0 or /24.     |
|                           | force                                                                                                                                                                                                                                                                                 | Joins if exists or creates if not.      |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                   |                                         |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                |                                         |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                              |                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                 |                                         |
| <b>Example</b>            | switch (config) # ib ha my-subnet<br>switch (config) #                                                                                                                                                                                                                                |                                         |
| <b>Related Commands</b>   | show ib ha                                                                                                                                                                                                                                                                            |                                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• A new subnet may be joined only after leaving the current one</li> <li>• All SM HA cluster members should be part of the same switch family (e.g. all members are part of SX60XX family or all members are part of SX65XX family)</li> </ul> |                                         |

## ib smnode

**ib smnode <hostname> [create | disable | enable | sm-priority <priority>]**  
**no ib smnode <hostname> [create | disable | enable | sm-priority]**

Manages HA SM.

The no form of the command removes HA SM node configuration.

|                           |                                                                               |                                                  |
|---------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Syntax Description</b> | hostname                                                                      | Specifies <hostname> SM configuration to modify. |
|                           | create                                                                        | Creates SM configuration for selected node.      |
|                           | disable                                                                       | Makes SM inactive on selected node.              |
|                           | enable                                                                        | Makes SM active on selected node.                |
|                           | sm-priority <priority>                                                        | Sets SM selected node priority (0=low, 15=high). |
| <b>Default</b>            | N/A                                                                           |                                                  |
| <b>Configuration Mode</b> | Config                                                                        |                                                  |
| <b>History</b>            | 3.1.0000                                                                      |                                                  |
| <b>Role</b>               | admin                                                                         |                                                  |
| <b>Example</b>            | <pre>switch (config) # ib smnode switch-1133ce create switch (config) #</pre> |                                                  |
| <b>Related Commands</b>   | <pre>show ib smnode show ib smnodes</pre>                                     |                                                  |
| <b>Note</b>               |                                                                               |                                                  |



## show ib smnode

**show ib smnode <hostname> {active | ha-role | ha-state | ip | sm-licensed | sm-priority | sm-running | sm-state}**

Displays SM High availability information.

|                           |                                                                                            |                                                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | hostname                                                                                   | Specifies <hostname> SM configuration to display.                                                                                                                                                                                                            |
|                           | active                                                                                     | Displays whether <hostname> is currently active.                                                                                                                                                                                                             |
|                           | ha-role                                                                                    | Displays the High Availability role of <hostname>. Possible return values are: offline, unknown, master, standby, or disabled.                                                                                                                               |
|                           | ha-state                                                                                   | Possible return values are: offline, init, searching, joining, online, creating, waiting, leaving, join-sync, failed, removed, or regroup.                                                                                                                   |
|                           | ip                                                                                         | Displays the local management IP address associated with the active node, <hostname>. If <hostname> is not active, the command displays “offline”.                                                                                                           |
|                           | sm-licensed                                                                                | Displays if <hostname> has an SM license. The command will display “active” only if <hostname> is currently active and has a license.                                                                                                                        |
|                           | sm-priority                                                                                | Displays the SM priority for SM running on <hostname>.                                                                                                                                                                                                       |
|                           | sm-running                                                                                 | Displays if <hostname> has an SM running. The command will display “active” (that is, SM is running) only if <hostname> is currently active, has a license, is enabled as a potential SM, is active as SM, and if there is a maximum of 2 SMs in the fabric. |
|                           | sm-state                                                                                   | Displays if SM is enabled to run on <hostname>.                                                                                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                        |                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                     |                                                                                                                                                                                                                                                              |
| <b>History</b>            | 3.1.0000                                                                                   |                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                      |                                                                                                                                                                                                                                                              |
| <b>Example</b>            | <pre>switch (config) # show ib smnode my-hostname sm-state enabled switch (config) #</pre> |                                                                                                                                                                                                                                                              |
| <b>Related Commands</b>   | show ib smnodes                                                                            |                                                                                                                                                                                                                                                              |
| <b>Note</b>               |                                                                                            |                                                                                                                                                                                                                                                              |

## show ib smnodes

### show ib smnodes [brief]

Displays information about all the systems that are active or might be able to run SM.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Syntax Description | brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Displays brief info on all HA nodes. |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |
| Configuration Mode | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |
| History            | 3.1.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
| Example            | <pre>switch (config) # show ib smnodes  HA state of switch infiniband-default ===== IB Subnet HA name: Piranha-648-324 HA IP address:      10.7.6.238/22 Active HA nodes:    1  HA node local information   Name:              43 (active)  &lt;--- (local node)   SM-HA state:       master   SM Licensed:       yes   SM Running:        stopped   SM Enabled:        disabled   SM Priority:        0   IP:                10.7.7.43  HA node local information   Name:              324-A (not active)   SM Enabled:        enabled   SM Priority:        10   IP:                offline  switch (config) # show ib smnodes brief  HA state of switch infiniband-default ===== IB Subnet HA name: Piranha-648-324 HA IP address:      10.7.6.238/22 Active HA nodes:    1    ID      SM-HA state  IP          SM          Priority   ----- *43      master      10.7.7.43   disabled     0   324-A    offline     offline     enabled      10  switch (config) #</pre> |                                      |
| Related Commands   | show ib smnode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |

## show ib ha

### show ib ha [brief]

Displays information about all the systems that are active or might be able to run SM.

|                           |                                                                                                                                                                                                                                                                                                                                                       |                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | brief                                                                                                                                                                                                                                                                                                                                                 | Displays HA information briefly. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                   |                                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                |                                  |
| <b>History</b>            | 3.1.0000                                                                                                                                                                                                                                                                                                                                              |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                 |                                  |
| <b>Example</b>            | <pre>switch (config) # show ib ha Global HA state ===== IB Subnet HA name:subnet4 HA IP address: 192.168.10.43/24 Active HA nodes: 2 ID                State Role          IP                SM Priority ----- switch            standalone 192.168.10.42     disabled switch            master    192.168.10.18     disabled switch (config) #</pre> |                                  |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                       |                                  |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                       |                                  |

## 7.6 Fabric Inspector

### 7.6.1 Running Diagnostics

➤ *To run ib fabric diagnostics:*

**Step 1.** Run test ib fabric to analyze the fabric.

```
switch (config) # test ib fabric
% -W- Topology file is not specified.
 Reports regarding cluster links will use direct routes.
-I- Using port 0 as the local port.
-I- Discovering ... 25 nodes (24 Switches & 1 CA-s) discovered.

-I-----
-I- Bad Guids/LIDs Info
-I-----
-I- skip option set. no report will be issued

-I-----
-I- Links With Logical State = INIT
-I-----
-W- link with LOG=INI found at direct path "24,19,17,20"
 From: a Switch PortGUID=0x0002c90200405b98 Port=20
 To: a Switch PortGUID=0x0002c90200405f98 Port=18
-W- link with LOG=INI found at direct path "24,19,17,21"
 From: a Switch PortGUID=0x0002c90200405b98 Port=21
 To: a Switch PortGUID=0x0002c90200405fa0 Port=18
-W- link with LOG=INI found at direct path "24,19,17,22"
 From: a Switch PortGUID=0x0002c90200405b98 Port=22
 To: a Switch PortGUID=0x0002c90200405fa0 Port=17
-W- link with LOG=INI found at direct path "24,19,17,23"
 From: a Switch PortGUID=0x0002c90200405b98 Port=23
 To: a Switch PortGUID=0x0002c90200405f70 Port=17
-W- link with LOG=INI found at direct path "24,19,17,24"
 From: a Switch PortGUID=0x0002c90200405b98 Port=24
 To: a Switch PortGUID=0x0002c90200405f70 Port=18
-W- link with LOG=INI found at direct path "24,19,17,25"
 From: a Switch PortGUID=0x0002c90200405b98 Port=25
 To: a Switch PortGUID=0x0002c90200405f80 Port=17
-W- link with LOG=INI found at direct path "24,19,17,26"
 From: a Switch PortGUID=0x0002c90200405b98 Port=26
 To: a Switch PortGUID=0x0002c90200405f80 Port=18
-W- link with LOG=INI found at direct path "24,19,17,27"
 From: a Switch PortGUID=0x0002c90200405b98 Port=27
 To: a Switch PortGUID=0x0002c90200405f60 Port=17
-W- link with LOG=INI found at direct path "24,19,17,28"
```

```

 From: a Switch PortGUID=0x0002c90200405b98 Port=28
 To: a Switch PortGUID=0x0002c90200405f60 Port=18
-W- link with LOG=INI found at direct path "24,19,17,29"
 From: a Switch PortGUID=0x0002c90200405b98 Port=29
 To: a Switch PortGUID=0x0002c90200405f68 Port=17
-W- link with LOG=INI found at direct path "24,19,17,30"
 From: a Switch PortGUID=0x0002c90200405b98 Port=30
 To: a Switch PortGUID=0x0002c90200405f68 Port=18
-W- link with LOG=INI found at direct path "24,19,17,31"
 From: a Switch PortGUID=0x0002c90200405b98 Port=31
 To: a Switch PortGUID=0x0002c90200405f88 Port=17
-W- link with LOG=INI found at direct path "24,19,17,32"
 From: a Switch PortGUID=0x0002c90200405b98 Port=32
 To: a Switch PortGUID=0x0002c90200405f88 Port=18
-W- link with LOG=INI found at direct path "24,19,17,33"
 From: a Switch PortGUID=0x0002c90200405b98 Port=33
 To: a Switch PortGUID=0x0012c90200405fa9 Port=18
-W- link with LOG=INI found at direct path "24,19,17,34"
 From: a Switch PortGUID=0x0002c90200405b98 Port=34
 To: a Switch PortGUID=0x0012c90200405fa9 Port=17
-W- link with LOG=INI found at direct path "24,19,17,35"
 From: a Switch PortGUID=0x0002c90200405b98 Port=35
 To: a Switch PortGUID=0x0002c90200405f90 Port=17
-W- link with LOG=INI found at direct path "24,19,17,36"
 From: a Switch PortGUID=0x0002c90200405b98 Port=36
 To: a Switch PortGUID=0x0002c90200405f90 Port=18

-I-----
-I- PM Counters Info
-I-----
-W- lid=0x0016 guid=0x0002c90200405a90 dev=48438 Port=23
 Performance Monitor counter : Value
 symbol_error_counter : 0xffff (overflow)

-I-----
-I- Fabric Partitions Report (see ibdiagnet.pkey for a full hosts list)
-I-----
-I- PKey:0x7fff Hosts:1 full:1 partial:0

-I-----
-I- IPoIB Subnets Check
-I-----
-I- Subnet: IPv4 PKey:0x7fff QKey:0x00000b1b MTU:2048Byte rate:10Gbps SL:0x00
-W- Suboptimal rate for group. Lowest member rate:20Gbps > group-rate:10Gbps

-I-----

```

```
-I- Bad Links Info
-I- No bad link were found
-I-----
```

```
-I- Done. Run time was 511 seconds.
switch [subnet2: master] (config) #
```

**Step 2.** Run `show fabric sm` to list the subnet managers.

```
switch [subnet2: master] (config) # show fabric sm

SM - master
 Port=9 lid=0x0001 guid=0x0002c90200405f60 dev=48438 priority:0

SM - standby
 The Local Device : Port=0 lid=0x0017 guid=0x0002c9020040c6d0 dev=48438 priority:0
 Port=10 lid=0x0018 guid=0x0002c9020040b2e8 dev=48438 priority:0
switch [subnet2: master] (config) #
```

**Step 3.** Run `show fabric pm` to display the performance counters' status.

```
switch [subnet2: master] (config) # show fabric pm
% -----
Port=27 lid=0x0014 guid=0x0012c90200405a81 dev=48438

symbol_error_counter = 0x0
link_error_recovery_counter = 0x0
link_down_counter = 0x0
port_rcv_errors = 0x0
port_xmit_discard = 0x0
vl15_dropped = 0x0
port_rcv_constraint_errors = 0x0
local_link_integrity_errors = 0x0
port_xmit_constraint_errors = 0x0
excessive_buffer_errors = 0x0
port_xmit_data = 0x7a1d8
port_rcv_data = 0x7a1d8
port_xmit_pkts = 0x1b23
port_rcv_pkts = 0x1b23
port_rcv_remote_physical_errors = 0x0
port_rcv_switch_relay_errors = 0x0

Port=28 lid=0x0014 guid=0x0012c90200405a81 dev=48438

symbol_error_counter = 0x0
link_error_recovery_counter = 0x0
link_down_counter = 0x0
port_rcv_errors = 0x0
port_xmit_discard = 0x0
```

```

vl15_dropped = 0x0
port_rcv_constraint_errors = 0x0
local_link_integrity_errors = 0x0
port_xmit_constraint_errors = 0x0
excessive_buffer_errors = 0x0
port_xmit_data = 0x7d7cf0
port_rcv_data = 0x7d7cf0
port_xmit_pkts = 0x1be2e
port_rcv_pkts = 0x1be2e
port_rcv_remote_physical_errors = 0x0
port_rcv_switch_relay_errors = 0x0

Port=10 lid=0x0006 guid=0x0002c90200405f98 dev=48438

symbol_error_counter = 0x0
link_error_recovery_counter = 0x0
link_down_counter = 0x0
port_rcv_errors = 0x0
...
...
...

Port=26 lid=0x0014 guid=0x0012c90200405a81 dev=48438

symbol_error_counter = 0x0
link_error_recovery_counter = 0x0
link_down_counter = 0x0
port_rcv_errors = 0x0
port_xmit_discard = 0x0
vl15_dropped = 0x0
port_rcv_constraint_errors = 0x0
local_link_integrity_errors = 0x0
port_xmit_constraint_errors = 0x0
excessive_buffer_errors = 0x0
port_xmit_data = 0x536d0
port_rcv_data = 0x536d0
port_xmit_pkts = 0x128a
port_rcv_pkts = 0x128a
port_rcv_remote_physical_errors = 0x0
port_rcv_switch_relay_errors = 0x0
switch [subnet2: master] (config) #

```

- Step 4.** Run `show interfaces ib` to display the status and configuration of the system's InfiniBand ports.

```

switch [subnet2: master] (config) # show interfaces ib
Slot 1 port 1 state
 Logical port state : Active

```

```

Physical port state : 10
Current line rate : 40.0 Gbps
Supported speeds : 10
Speed : 10.0 Gbps
Supported widths : 10
Width : 12X
Max supported MTUs : 10
MTU : 10
VL capabilities : 10
Operational VLS : 10

```

```

RX bytes : 255
RX packets : 255
RX errors : 255
Symbol errors : 255
VL15 dropped packets: 255

```

```

TX bytes : 255
TX packets : 255
TX wait : 255
TX discarded packets: 255

```

#### Slot 1 port 2 state

```

Logical port state : Active
Physical port state : 10
Current line rate : 40.0 Gbps
Supported speeds : 10
Speed : 10.0 Gbps
Supported widths : 10
Width : 12X
Max supported MTUs : 10
MTU : 10
VL capabilities : 10
Operational VLS : 10

```

```

RX bytes : 255
RX packets : 255
RX errors : 255
Symbol errors : 255
VL15 dropped packets: 255

```

```

TX bytes : 255
TX packets : 255
TX wait : 255
TX discarded packets: 255

```



```

Slot 1 port 3 state
...
Slot 1 port 36 state
 Logical port state : Active
 Physical port state : 10
 Current line rate : 40.0 Gbps
 Supported speeds : 10
 Speed : 10.0 Gbps
 Supported widths : 10
 Width : 12X
 Max supported MTUs : 10
 MTU : 10
 VL capabilities : 10
 Operational VLS : 10

 RX bytes : 255
 RX packets : 255
 RX errors : 255
 Symbol errors : 255
 VL15 dropped packets: 255

 TX bytes : 255
 TX packets : 255
 TX wait : 255
 TX discarded packets: 255

switch [subnet2: master] (config) #

```

## 7.6.2 Mapping GUIDs to Node Names

To replace module GUIDs and assign meaningful names to modules use the `ib nodename` command. For further information, see *MLNX-OS CLI User Guide*.

## 7.6.3 Importing ibdiagnet Fabric Data

The `ib fabric import <fabric data filename>` command imports a “snapshot” of fabric data. The imported file is an output of the `ibdiagnet` tool that has previously run on any node connected to the fabric. Prior to importing fabric data, it is required to run the `ibdiagnet` tool to produce fabric data files.

Note that there are two versions of the `ibdiagnet` tool. The earlier version produces three output files describing the fabric (`ibdiagnet.db`, `ibdiagnet.pm`, and `ibdiagnet.sm`), whereas the new version produces a single file (`ibdiagnet.db_csv`).

### ➤ To make an *ibdiagnet* run and import its fabric data:

#### Step 1. Collect *ibdiagnet* data.

Run the following command from any node connected to the fabric. By default, `ibdiagnet` places the output file(s) under `/tmp`.

*Old ibdiagnet version:*

```
> ibdiagnet -csv -skip dup_guids zero_guids logical_state part ipoib -pm
```

*New ibdiagnet version:*

```
> ibdiagnet -pm
```

**Step 2.** Change directory to the ibdiagnet output directory.

The default directory is /tmp.

```
> cd <ibdiagnet output directory>
```

**Step 3.** Create an ibdiagnet output tarball. Run:

```
> tar cvzf <filename>.tgz ibdiagnet*
```

**Step 4.** Copy the tarball <filename>.tgz to the switch using the `image fetch` command. Run (in enable or config mode):

```
switch # image fetch scp://<user name>:<password>@<hostname>/<full path to <file-
name>.tgz>
100.0%[#####]
#####]
switch #
```

**Step 5.** Import the ibdiagnet file(s). Run:

```
switch [subnet2: master] (config) # ib fabric <filename>.tgz
Fabric data import successful
switch [subnet2: master] (config) #
```

## 7.6.4 Commands

### ib fabric import

**ib fabric import <filename>**

Imports a “snapshot” of fabric data. It retrieves fabric data from the following ibdiagnet output files: ibdiagnet.db, ibdiagnet.sm and ibdiagnet.pm.

|                           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | filename                                                                                                                                                                                                                                                                                                                                                                                 | The imported file. It is an output of the ibdiagnet tool that has previously run on any node connected to the fabric, and is assumed to be a zip file with a .gz or .tgz extension. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                     |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                     |
| <b>Example</b>            | switch (config) # ib fabric import snapshot.tgz<br>switch (config) #                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                     |
| <b>Related Commands</b>   | show ib fabric nodes                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>To display the results of this import, you may run “show ib fabric” commands (e.g., “show ib fabric nodes type switch”)</li> <li>Imported data can be displayed as long as you do not run the command “ib fabric refresh”, which overwrites the imported data</li> <li>The import command cannot execute without the ibdiagnet.db file</li> </ul> |                                                                                                                                                                                     |

## ib fabric monitor

**ib fabric monitor**  
**no ib fabric monitor**

Enables fabric monitoring.  
 The no form of the command disables fabric monitoring.

|                           |                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                            |
| <b>Default</b>            | N/A                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                         |
| <b>History</b>            | 3.1.1400                                                                                                       |
| <b>Role</b>               | admin                                                                                                          |
| <b>Example</b>            | switch (config) # ib fabric monitor<br>switch (config) # show ib fabric monitor<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib fabric monitor                                                                                         |
| <b>Note</b>               |                                                                                                                |

## ib fabric nodenames

**ib fabric nodenames**  
**no ib fabric nodenames**

Imports fabric SysNames.  
The no form of the command removes imported SysNames.

|                           |                                                            |
|---------------------------|------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                        |
| <b>Default</b>            | N/A                                                        |
| <b>Configuration Mode</b> | Config                                                     |
| <b>History</b>            | 3.1.1400                                                   |
| <b>Role</b>               | admin                                                      |
| <b>Example</b>            | switch (config) # ib fabric nodenames<br>switch (config) # |
| <b>Related Commands</b>   |                                                            |
| <b>Note</b>               |                                                            |

## ib fabric refresh

### ib fabric refresh

Takes a “snapshot” of the current fabric data.

|                           |                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                            |
| <b>Default</b>            | N/A                                                                                                                            |
| <b>Configuration Mode</b> | Config                                                                                                                         |
| <b>History</b>            | 3.1.1400                                                                                                                       |
| <b>Role</b>               | admin                                                                                                                          |
| <b>Example</b>            | switch (config) # ib fabric refresh<br>switch (config) #                                                                       |
| <b>Related Commands</b>   | show ib fabric nodes                                                                                                           |
| <b>Note</b>               | If the fabric is large, this command may take a long time to complete.<br>this command requires license (LIC-fabric-inspector) |

## ib fabric transceiver-info

**ib fabric transceiver-info enable**  
**no ib fabric transceiver-info enable**

Enables collection of active cable info.  
 The no form of the command disables collection of active cable info.

|                           |                                                                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                              |
| <b>Default</b>            | N/A                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                           |
| <b>History</b>            | 3.1.1400                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                            |
| <b>Example</b>            | <pre>switch (config) # ib fabric transceiver-info enable switch (config) # show ib fabric transceiver-info enable enable switch (config) #</pre> |
| <b>Related Commands</b>   | show ib fabric nodes                                                                                                                             |
| <b>Note</b>               |                                                                                                                                                  |

# test ib fabric

## test ib fabric [route]

Perform infiniband fabric test

|                           |               |
|---------------------------|---------------|
| <b>Syntax Description</b> | route         |
| <b>Default</b>            | N/A           |
| <b>Configuration Mode</b> | Config        |
| <b>History</b>            | 3.1.0000      |
| <b>Role</b>               | monitor/admin |



**Example**

```

switch (config) # (config) # test ib fabric
% -----
-I- Plugins load will be skipped

Discovery
-I- Discovering ... 1 nodes (1 Switches & 0 CA-s) discovered.
-I- Discovery finished successfully

-I- Duplicated GUIDs detection finished successfully

-I- Duplicated Nodes Descriptions detection finished successfully

Lids Check
-E- Lids Check finished with errors
-E- IBM-QA-Bay3: SX90Y3245/U1/P0 - Configured with ZERO lid

Links Check
-I- Links Check finished successfully

Subnet Manager
-I- SM Info retrieving finished successfully

-E- Subnet Manager Check finished with errors
-E- Not found master subnet manager in fabric

Port Counters
-I- Lids Check failed, no response for some MADs can occurred
-I- Ports counters retrieving finished successfully

-I- Ports counters value Check finished successfully

-I- Ports counters Difference Check will be skipped - pause time is zero

Nodes Information
-I- Lids Check failed, no response for some MADs can occurred
-W- Nodes Info retrieving finished with errors
-W- IBM-QA-Bay3: SX90Y3245/U1 - No response for MAD VSGeneralInfo

-I- FW Check finished successfully

Speed / Width checks
-I- Link Speed Check (Compare to supported link speed)
-I- Links Speed Check finished successfully

-I- Link Width Check (Compare to supported link width)
-I- Links Width Check finished successfully

Summary
-I- Stage Warnings Errors Comment
-I- Discovery 0 0
-I- Lids Check 0 1
-I- Links Check 0 0
-I- Subnet Manager 0 1
-I- Port Counters 0 0
-I- Nodes Information 1 0
-I- Speed / Width checks 0 0
...
switch (config) #

```

**Related Commands**

**Note**

## show ib fabric connections

**show ib fabric connections [attrib <speed/width>] [details] [type]**

Displays the ib fabric connections with optional relevant filter.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | attrib <speed/width>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Attribute of connection to filter on.                                                                                                                                                                                                                                                                                                               |
|                           | details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Displays details info.                                                                                                                                                                                                                                                                                                                              |
|                           | type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Filter connections by type. <ul style="list-style-type: none"> <li>sw-2-sw-any - Any sort of switch to switch connection</li> <li>sw-2-sw-int - Internal switch to switch connection</li> <li>sw-2-sw-ext - External switch to switch connection</li> <li>sw-2-ca - Switch to host connection</li> <li>ca-2-ca - Host to host connection</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show ib fabric connections PORT-1          PORT-2          DESCRIPTION 00:08:F1:00:01:08:B5:C0-0001  00:08:F1:05:00:20:2F:7B-0035  Active 4X @ 5.0 Gbps mtu=4096 VL0 00:02:C9:03:00:61:FA:20-0001  00:08:F1:05:00:20:2F:7B-0011  Active 4X @ 10 Gbps mtu=4096 VL0, VL1 00:02:C9:03:00:61:FA:30-0002  00:08:F1:05:00:20:2F:7B-0013  Active 4X @ 10 Gbps mtu=4096 VL0, VL1 00:02:C9:03:00:61:FA:30-0001  00:08:F1:05:00:20:2F:7B-0014  Active 4X @ 10 Gbps mtu=4096 VL0, VL1 00:02:C9:03:00:5D:30:72-0004  00:08:F1:05:00:20:2F:7B-0017  Active 4X @ 10 Gbps mtu=4096 VL0 - VL7 00:02:C9:03:00:5D:30:72-0001  00:08:F1:05:00:20:2F:7B-0034  Active 4X @ 10 Gbps mtu=4096 VL0 - VL7 00:02:C9:03:00:30:95:90-0001  00:02:C9:03:00:5D:D7:B0-0003  Active 4X @ 10 (FDR10) mtu=2048 VL0 - VL7 00:02:C9:03:00:4A:E6:FE-0001  00:02:C9:03:00:5D:D7:B0-0007  Active 4X @ 10 Gbps mtu=2048 VL0 - VL7 00:02:C9:03:00:30:95:A0-0001  00:02:C9:03:00:5D:D7:B0-0008  Active 4X @ 10 (FDR10) mtu=2048 VL0 - VL7 00:02:C9:03:00:2E:E3:F0-0001  00:02:C9:03:00:5D:D7:B0-0011  Active 4X @ 10 (FDR10) mtu=2048 VL0 - VL7 switch (config) #</pre> |                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                     |

## show ib fabric messages

### show ib fabric messages

Displays the InfiniBand fabric error and warning messages.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>            | <pre>switch (config) # show ib fabric messages Warning Invalid(0x02) LinkWidthSupported   port 00:02:C9:03:00:30:95:90-0001  Warning Invalid(0x02) LinkWidthSupported   port 00:02:C9:03:00:30:95:A0-0001 Error   Internal SXX506 map error L02-19 should be S01/U1.7, not S01- 10(L02/U1.22)   port 00:02:C9:03:00:49:7D:C0-0019   port 00:02:C9:03:00:5D:30:70-0010  Error   Internal SXX506 map error L02-20 should be S01/U1.8, not S01- 7(L02/U1.19)   port 00:02:C9:03:00:49:7D:C0-0020   port 00:02:C9:03:00:5D:30:70-0007 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## show ib fabric monitor

### show ib fabric monitor [<type>]

Displays the InfiniBand fabric monitor admin state and statistics count.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type <ul style="list-style-type: none"> <li>active-links - Displays number of active point-to-point links</li> <li>active-ports - Displays number of active ports in subnet</li> <li>host-ports - Displays number of CA ports in subnet</li> <li>nodes - Displays number of active IB chips in subnet</li> <li>snapshot-time - Date/time of this snapshot</li> <li>switches - Displays number of switches in subnet</li> <li>systems - Displays number of active systems in subnet</li> <li>unique-GUIDs - Displays total number of unique GUIDs on fabric</li> <li>warnings - Displays number of topology warnings issued</li> </ul> |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show ib monitor active-links 17 switch (config) # show ib monitor enable switch (config) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## show ib fabric node

**show ib fabric node <system-guid> [ports]**

Displays InfiniBand fabric info on one node.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |  |  |  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--|--|--|
| Syntax Description | system-guid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The node GUID.                               |  |  |  |
|                    | ports                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Displays the info on the ports on this node. |  |  |  |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |  |  |  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |  |  |  |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                              |  |  |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |  |  |  |
| Example            | <pre>switch (config) # show ib fabric node 00:02:C9:03:00:5D:D7:B0 ports System - switch node 00:02:C9:03:00:5D:D7:B0 Node details System GUID      00:02:C9:03:00:5D:D7:B0   Type           SW SX60XX standalone PCI 51000:713   Ports          36   Cable support   Supported   PCI Device ID   51000   PCI Vendor ID   0x0002c9   Base version    1   Class version   1   Revision        161   Partition cap   8   Descriptions    MF0;l-supp-SX6036: SX60XX/U1  Type  Port                               Desc              State  Rate SW    00:02:C9:03:00:5D:D7:B0-0000      Switch port 0      Link Up 10 Gbps SW    00:02:C9:03:00:5D:D7:B0-0001      Port 1              Polling Up to 40 Gbps SW    00:02:C9:03:00:5D:D7:B0-0002      Port 2              Polling Up to 40 Gbps SW    00:02:C9:03:00:5D:D7:B0-0003      Port 3              Link Up 41 Gbps SW    00:02:C9:03:00:5D:D7:B0-0004      Port 4              Polling Up to 40 Gbps SW    00:02:C9:03:00:5D:D7:B0-0005      Port 5              Polling Up to 40 Gbps SW    00:02:C9:03:00:5D:D7:B0-0006      Port 6              Polling Up to 40 Gbps switch (config) #</pre> |                                              |  |  |  |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |  |  |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |  |  |  |

## show ib fabric nodes

**show ib fabric nodes [cable <cable-options>] [role <role-options>] [type <system-type>]**

Displays InfiniBand fabric info on all nodes with filtering options.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                      |  |  |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Syntax Description | cable-options                                                                                                                                                                                                                                                                                                                                                                                                                  | Filters the list by cable type: <ul style="list-style-type: none"><li>errors - Node with cable errors</li><li>no-errors - Node with no cable errors</li><li>supports - Node support active cables</li><li>no-support - Node does not support active cables</li></ul> |  |  |
|                    | role-options                                                                                                                                                                                                                                                                                                                                                                                                                   | Filters the list by role: <ul style="list-style-type: none"><li>multi-chip - Systems with more than 1 nodes</li><li>single-chip - Systems with 1 node</li><li>leaf - Leaf node</li><li>spine - Spine node</li><li>&lt;system&gt; - Any supported system</li></ul>    |  |  |
|                    | system-type                                                                                                                                                                                                                                                                                                                                                                                                                    | Filters the list by system type: <ul style="list-style-type: none"><li>switch - Switches only</li><li>host - Hosts only</li><li>router - Routers only</li><li>unknown - Unknowns systems only</li></ul>                                                              |  |  |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                      |  |  |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                      |  |  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                      |  |  |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                      |  |  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                      |  |  |
| Example            | <pre>switch (config) # show ib fabric nodes System name/GUID      Type      Node GUID      Description 00:02:C9:03:00:5C:F7:20  SW      00:02:C9:03:00:5C:F7:20  PCI 51000:713 00:02:C9:03:00:09:DA:BD  CA      00:02:C9:03:00:09:DA:BA  PCI 26428:713 00:02:C9:03:00:09:28:17  CA      00:02:C9:03:00:09:28:14  PCI 26428:713 00:02:C9:03:00:5C:6E:00  SW      00:02:C9:03:00:5C:6E:00  PCI 51000:713 switch (config) #</pre> |                                                                                                                                                                                                                                                                      |  |  |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                      |  |  |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                      |  |  |

## show ib fabric port

**show ib fabric port <port-guid>**

Displays InfiniBand fabric info on one port in the fabric.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Syntax Description</b> | port-guid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The port GUID. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |
| <b>Example</b>            | <pre>switch (config) # show ib fabric port 00:02:C9:03:00:5C:6E:00-0034 SXCA07156 00:02:C9:03:00:5C:6E:00 port 00:02:C9:03:00:5C:6E:00-0034   Type          SW          Port state      Polling   Speed          2.5 Gbps    Supported speeds 2.5 / 5 / 10 Gbps   Width          4X          Supported widths 1X, 4X   Operational VLS VL0 - VL7    VL capabilities VL0 - VL7   Port GUID      NA          System GUID            02:C9:03:00:5C:6E:00 MTU            4096   Max supported MTUs 4096   VL arbitration high 8          VL Arbitration low 8   VL high limit      4          VL stall count    7   Has errors         false      Has traffic        false</pre> |                |
|                           | switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |



## show ib fabric ports

**show ib fabric ports** [**attrib** <attrib-options>] [**data** <data-options>] [**errors** <errors-options>] [**sm** <sm-options>] [**state** <state-options>] [**type** <port-type-options>]

Displays InfiniBand fabric info on all ports with filtering options.

|                           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | attrib-options    | Filters the speed and width.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                           | data-options      | Filters port by data transfer counts: <ul style="list-style-type: none"> <li>• none - No data</li> <li>• any - Any data</li> <li>• lots - High rate of data</li> <li>• little - Low rate of data</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                           | errors-options    | Filters port by error counts: <ul style="list-style-type: none"> <li>• none- No errors</li> <li>• any - Any errors</li> <li>• symbol - Any symbol errors</li> <li>• recv - Any receive errors</li> <li>• sym-or-recv - Any symbol or receive errors</li> <li>• cable - Any cable errors</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       |
|                           | sm-options        | Filters port by SM running states: <ul style="list-style-type: none"> <li>• active - Has an active SM</li> <li>• none - Does not have an SM</li> <li>• master - Has master SM</li> <li>• standby - Has a standby SM</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                           | state-options     | Filters port by port state: <ul style="list-style-type: none"> <li>• linkup - Link up state</li> <li>• polling - Polling state</li> <li>• unusual - Any unusual state</li> <li>• normal - Link up or polling state</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                           | port-type-options | Filters port by port type: <ul style="list-style-type: none"> <li>• switch-any-port - All switch ports</li> <li>• switch-port0 - Switch port 0 only</li> <li>• switch-not-P0 - Switch ports except 0</li> <li>• switch-int - Internal switch ports</li> <li>• switch-ext - External switch ports</li> <li>• port-has-lid - CA or switch port 0</li> <li>• has-cable-info - Port has an active cable</li> <li>• has-no-cable-info - No active cable on port</li> <li>• host - Host ports</li> <li>• router - Router ports</li> <li>• has-valid-LID - Ports with valid LIDs</li> <li>• invalid-LID - Ports with invalid LIDs</li> <li>• unknown - Unknown ports</li> </ul> |
| <b>Default</b>            |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Configuration Mode</b> | Any Command Mode  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>History</b>            | 3.1.1400          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Role</b>             | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Example</b>          | <pre> switch (config) # show ib fabric ports 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0000 Switch port 0      Link Up  10 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0001    Port 1      Link Up  40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0002    Port 2      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0003    Port 3      Link Up  40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0004    Port 4      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0005    Port 5      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0006    Port 6      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0007    Port 7      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0008    Port 8      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0009    Port 9      Polling  Up to 40 Gbps 00:02:C9:03:00:5C:F7:20    SW      00:02:C9:03:00:5C:F7:20-0010    Port 10     Polling  Up to 40 Gbps switch (config) # </pre> |
| <b>Related Commands</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Note</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## show ib fabric system

**show ib fabric system <system-guid> [nodes | ports]**

Displays InfiniBand fabric info on a specific system.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------|-------|----|-----------|-------------------------|-----------|---------------|-------|----|------|----|-----------|---------------|
| Syntax Description | system-guid                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The system GUID.                |            |       |    |           |                         |           |               |       |    |      |    |           |               |
|                    | nodes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Adds list of nodes information. |            |       |    |           |                         |           |               |       |    |      |    |           |               |
|                    | ports                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Adds list of ports information. |            |       |    |           |                         |           |               |       |    |      |    |           |               |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |
| History            | 3.1.1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |
| Example            | <pre>switch (config) # show ib fabric system 00:02:C9:03:00:5C:F7:20 nodes System - 00:02:C9:03:00:5C:F7:20   Model          SXCA07156   Revision Rev    Rev 1   System         36 port SW   Element count   1   Description     BX900S1P00355-CB5</pre> <table><tr><td>Node GUID</td><td>00:02:C9:03:00:5C:F7:20</td><td>Role</td><td>standalone</td><td>Ports</td><td>36</td><td>Type</td><td>SW</td><td>Descrpton</td><td>PCI 51000:713</td></tr></table> <pre>switch (config) #</pre> |                                 |            |       |    | Node GUID | 00:02:C9:03:00:5C:F7:20 | Role      | standalone    | Ports | 36 | Type | SW | Descrpton | PCI 51000:713 |
| Node GUID          | 00:02:C9:03:00:5C:F7:20                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Role                            | standalone | Ports | 36 | Type      | SW                      | Descrpton | PCI 51000:713 |       |    |      |    |           |               |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |
| Note               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |            |       |    |           |                         |           |               |       |    |      |    |           |               |

## show ib fabric sys

**show ib fabric sys [config <role-options>] [type <system-type>]**

Displays ib fabric info on all systems with filtering options.

|                           |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | role-options                                                                                                                                                                                                                                                                                      | Filters the list by role: <ul style="list-style-type: none"> <li>• multi-chip - Systems with more than 1 nodes</li> <li>• single-chip - Systems with 1 node</li> <li>• &lt;system&gt; - Any supported system</li> </ul> |
|                           | system-type                                                                                                                                                                                                                                                                                       | Filters the list by system type: <ul style="list-style-type: none"> <li>• switch - Switches only</li> <li>• host - Hosts only</li> <li>• router - Routers only</li> <li>• unknown - Unknowns systems only</li> </ul>    |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                         |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                         |
| <b>History</b>            | 3.1.1400                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                         |
| <b>Example</b>            | <pre>switch (config) # show ib fabric sys 00:02:C9:03:00:5C:F7:20      SXCA07156   36 port SW 1 node 00:02:C9:03:00:09:DA:BD           2 port host 1 node 00:02:C9:03:00:09:28:17           2 port host 1 node 00:02:C9:03:00:5C:6E:00      SXCA07156   36 port SW 1 node switch (config) #</pre> |                                                                                                                                                                                                                         |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                         |
| <b>Note</b>               |                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                         |

## show ib fabric transceiver-info

### show ib fabric transceiver-info enable

Displays the admin state of the InfiniBand fabric transceiver info.

|                           |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                     |
| <b>Default</b>            | N/A                                                                                     |
| <b>Configuration Mode</b> | Config                                                                                  |
| <b>History</b>            | 3.1.1400                                                                                |
| <b>Role</b>               | admin                                                                                   |
| <b>Example</b>            | switch (config) # show ib fabric transceiver-info enable<br>enable<br>switch (config) # |
| <b>Related Commands</b>   | show ib fabric nodes                                                                    |
| <b>Note</b>               | If enabled, transceiver info will be gathered by the InfiniBand fabric.                 |

## 8 Gateway



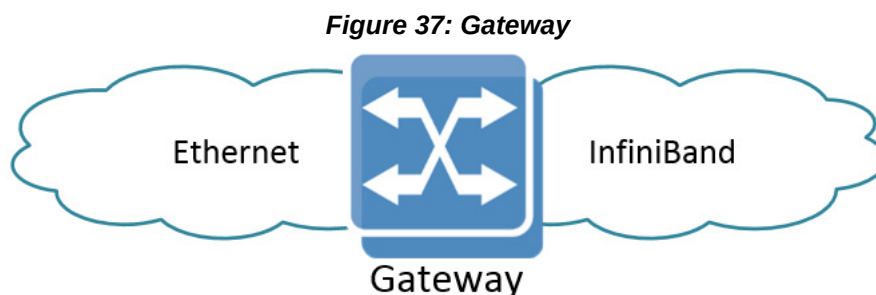
Gateway is not supported in MLNX-OS release 3.4.1110.

When the network consists of two types of link protocols (Ethernet and InfiniBand), Proxy-ARP can be used to forward IPv4 packets from the Ethernet network to the InfiniBand network and vice versa. Proxy-ARP is not an IP Router, but acts as a bridge that forwards the IPoETH packets to IPoIB in Unreliable Datagram (UD).

The Proxy-ARP forwards the traffic in a single subnet.



IP Routing, InfiniBand SM and IGMP snooping must be disabled to enable Proxy-ARP.



### 8.1 Proxy-ARP Prerequisites

Before trying to configure a Proxy-ARP in the system make sure the following conditions are met:

- Gateway license is installed (UPGR-XXXX-GW) on the switch. Run the command `show system capabilities` to verify that.



The switch system SX6036G does not require a Gateway license.

- The system profile is `vpi-single-switch`. Run the command `show system profile` to verify that. For additional information on the system profile refer to [Section 4.5, “System Profile,”](#) on page 176.
- InfiniBand and Ethernet interfaces are mapped on the system. Run the command `show ports type` to verify that. For additional information on the port mapping refer to [Section 4.4, “Virtual Protocol Interconnect \(VPI\),”](#) on page 172.
- IP routing is disabled. To disable it run:

```
switch (config)# no ip routing
```

- IGMP snooping is disabled. To disable it run:

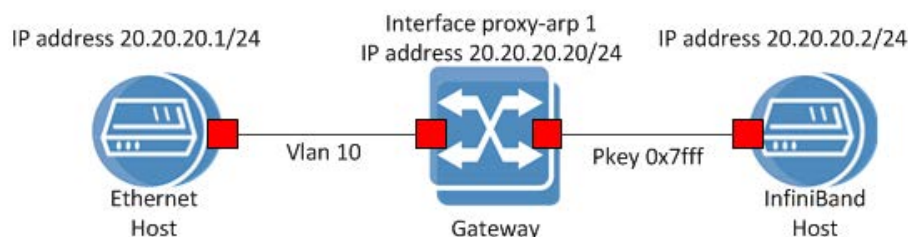
```
switch (config)# no ip igmp snooping
```

- InfiniBand SM is disabled. To disable it run:

```
switch (config)# no ib sm
```

## 8.2 Proxy-ARP Overview

**Figure 38: Basic Gateway Setup**



### 8.2.1 Proxy-ARP Modes

Proxy-ARP supports unicast and multicast modes.



Multicast configuration is not available in unicast mode.



Proxy-ARP modes can be configured only when Proxy-ARP is disabled (no ip proxy-arp).



When Proxy-ARP modes are modified, interface configuration is removed. The user is prompted to approve this.

#### 8.2.1.1 Proxy-ARP Unicast

An ARP request sent from an InfiniBand host is terminated at the Proxy-ARP. Then a new ARP request is generated and sent on the VLAN interface to reach the Ethernet host. The Ethernet host responds with an ARP reply to the Proxy-ARP. The Proxy-ARP then terminates it and generates a new ARP reply to the InfiniBand host. Once the destination address has been resolved, unicast traffic is passed from the InfiniBand host to the Ethernet host. The process is similar in the opposite direction (Ethernet to InfiniBand).

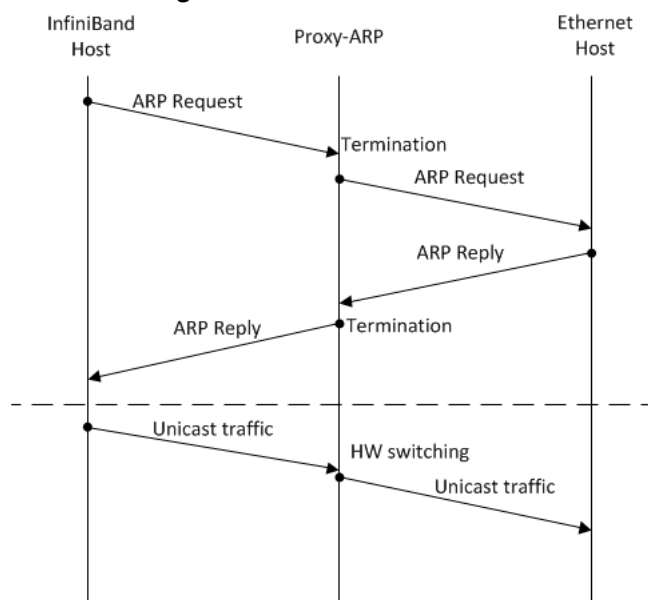
**Figure 39: Unicast ARP Flow**

Table 54 details traffic forwarding in unicast (UC) mode.

**Table 54 - IPoIB Forwarding**

| Case                                                                                                 | IPoETH-to-IPoIB                                                | IPoIB-to-IPoETH                                        |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------|
| Unicast                                                                                              | Forward according to HA load balancing algorithm. <sup>1</sup> | Forward according to HA load balancing algorithm.      |
| Multicast                                                                                            | Drop                                                           | Drop                                                   |
| Broadcast (255.255.255.255); Subnet broadcast                                                        | Forward by software in case the box is the GLBP master         | Forward by software in case the box is the GLBP master |
| Master advertisement MC group (239.0.0.77); all-node group (224.0.0.1); all-router group (224.0.0.2) | Does not forward (local termination)                           | Does not forward (local termination)                   |

1. See Section 8.2.2.4, “Proxy-ARP Load Balancing,” on page 1196

### 8.2.1.2 Proxy-ARP Multicast



Broadcast and subnet broadcast are supported in Proxy-ARP HA and are forwarded by the GLBP master.

With IB-to-ETH multicast (MC) flow, the Proxy-ARP signs up to receive InfiniBand MC notifications. Upon InfiniBand MC group creation, the Proxy-ARP is notified and as a result, the Proxy-ARP sends a join request and triggers IGMP query. The host then receives the query and sends an IGMP join request which is forwarded to the MC router on the Ethernet side.



With ETH-to-IB MC flow, MC traffic is forwarded to the Proxy-ARP. The Proxy-ARP forwards the packet to the InfiniBand side only if a MC group is created (a MC route configured on the Proxy-ARP or dynamically according to the flow above). Otherwise, it would be dropped.



We assume that the MC router is on the Ethernet side.

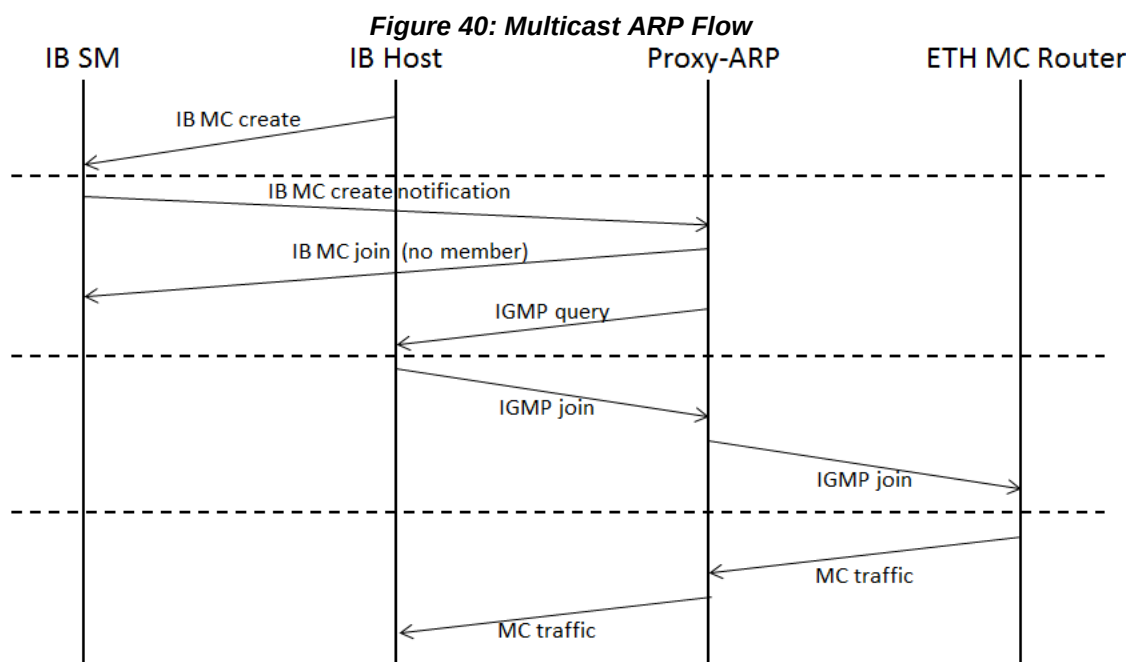


Table 55 specifies how Proxy-ARP forwards multicast traffic.

**Table 55 - IPoIB Multicast Forwarding**

| Case                                                                        | IPoETH-to-IPoIB                                        | IPoIB-to-IPoETH                                        |
|-----------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|
| Unicast                                                                     | Forward                                                | Forward                                                |
| Multicast                                                                   | Forward according to HA load balancing algorithm       | Forward according to HA load balancing algorithm       |
| Broadcast (255.255.255.255); Subnet broadcast; All-router group (224.0.0.2) | Forward by software in case the box is the GLBP master | Forward by software in case the box is the GLBP master |
| All-node group (224.0.0.1)                                                  | Forward in case the box is the GLBP master             | Forward in case the box is the GLBP master             |

## 8.2.2 Proxy-ARP High Availability



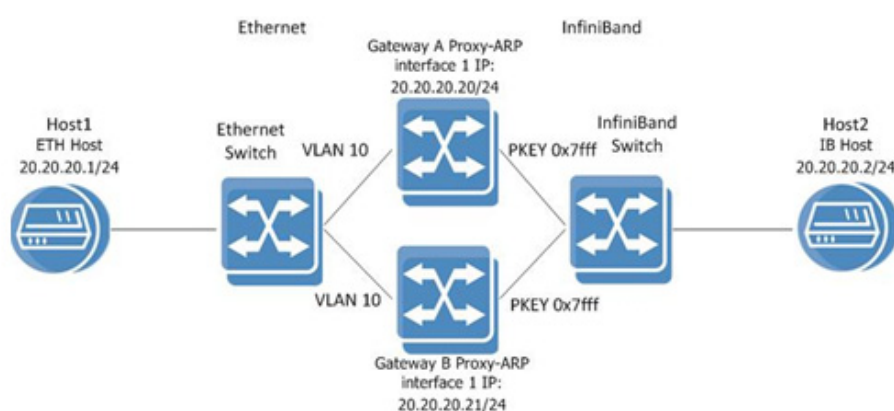
All nodes in a Proxy-ARP HA group must feature of the same CPU type (i.e. PPC or x86).



Proxy-ARP interfaces support IGMPv2 only.

High availability (HA) refers to a system or component that is continuously operational for a desirably extended period of time. The following sections introduce Mellanox high availability Proxy-ARP.

**Figure 41: High Availability Proxy-ARP Interface**



All gateway nodes must be on the same management IP subnet.

Proxy-ARP HA reduces downtime and disruption as it is continuously operational for a desirably long length of time. It assures continuity of the work even when one Gateway fails. The database is synchronized with all the nodes participating in the Proxy-ARP group and a configuration change is prepared. The synchronization is done out-of-band using an Ethernet management network.

All the nodes that participate in the Proxy-ARP group are joined under a Proxy-ARP group name. One of the nodes is elected as master and the others become slaves. Proxy-ARP HA uses an IP address (VIP) that is always directed to the master node. The configuration is set via the VIP to the master node which in turn distributes it to the slave nodes.



The VIP address should be on the same management IP subnet.

### 8.2.2.1 Joining, Creating or Leaving a Proxy-ARP HA Group



When transitioning from standalone into a group or vice versa, a few seconds are required for the node state to stabilize. During that time, group features such as Gateway HA, SM HA, and MLAG commands should not be executed. To run group features, wait for the CLI prompt to turn into [standalone:master], [<group>:master] or [<group>:standby] instead of [standalone:\*unknown\*] or [<group>:\*unknown\*].

A Proxy-ARP group is formed by a network of Gateway nodes. Each group may be composed of up to 16 nodes. A Proxy-ARP group has a name identifier used for joining or leaving the group.

To create, join or leave a Gateway subnet, one may use the following commands:

- Create – proxy-arp ha <group-name> ip <ip\_addr> <mask>
- Join – proxy-arp ha <group-name>
- Leave – no proxy-arp ha

For further information see [Section 8.2.2.6, “Managing High-Availability Proxy-ARP Groups,” on page 1197](#).

### 8.2.2.2 MLNX-OS Management Centralized Location

MLNX-OS centralized management infrastructure enables the user to configure or modify an existing configuration and monitor a Proxy-ARP group’s running status. MLNX-OS centralized management IP (VIP) is defined when the first Proxy-ARP HA group member is added by using the command proxy-arp ha <group-name> ip <ip\_addr> <mask>. Proxy-ARP HA always directs the configured IP address (VIP) to the master node.

The VIP is always serviced by the node which is currently the master of the HA group. It is always active even if one or more of the members are down.

### 8.2.2.3 High Availability Node Roles

A node, in this case, is a Gateway switch system. Every node member of a Proxy-ARP HA group has one of the following roles:

- Master – the node that manages HA configurations and service to the VIP addresses.
- Standby – each node that can replace the master node and take over its responsibilities once the master node is down

Nodes support the following functions:

- Discovery – network discovery
- Master election – electing a master node among the nodes running in a group.
- Failure detection – detecting failure if a node goes down. In case of failure the system recovers and ensures a master node is available.
- Configuration replication – configuration on the master node is replicated on the slave node.

➤ **To see the mode of the current node, look at the CLI prompt for the following format:**

```
<host name> [<subnet ID>:<mode>] (config) #
```

To see a list of the existing nodes and details about the running state, run the command show proxy-arp ha.

### 8.2.2.4 Proxy-ARP Load Balancing



Changing box mode from single box to HA for the first time may cause traffic loss for up to 1 minute.



Changing modes from HA to single-box removes member related configuration.

Proxy-ARP HA features two load balancing modes:

- Active-Active – the Gateway nodes within the group are all active and share the traffic load
- Active-Standby – one Gateway nodes handles all the traffic while the others are on standby mode

The Active-Active load balancing algorithm is based on a VRRP-like protocol. IP addresses of hosts are distributed between the active Gateway systems. Upon adding or removing a new member the load is redistributed among the members accordingly. To minimize traffic loss, when a member is added, traffic is passed to it only once the new member is operationally ready. Once the new member begins serving a group of IP hosts, it sends gratuitous ARPs for the purpose of rapid stabilization. Other than in cases when a Proxy-ARP HA member leaves or joins the group, traffic does not move between existing members so as to minimize loss of traffic.

Active-Active load balancing is of three types:

- InfiniBand base IP – based on the destination IP for Ethernet sourced traffic, and source IP for InfiniBand sourced traffic
- Ethernet base IP – based on the destination IP for InfiniBand sourced traffic, and source IP for Ethernet sourced traffic
- Source IP Destination IP – best distribution of traffic when many hosts are populated on both sides

In Active-Standby load balancing the Proxy-ARP HA member with the highest priority is the one selected to pass the traffic. However, if two members have the same priority, the one with the highest GUID number carries all the traffic.

Member nodes in the Proxy-ARP HA group are organized into a virtual ring. Within this group, the following fail scenarios may occur depending on the failing node:

- Master fails – the standby detects it, becomes master, and selects a new standby node from the list of members making failover fast
- Standby fails – the master selects a new standby out of the remaining members

### 8.2.2.5 Prerequisites

The HA Proxy-ARP prerequisites match those of the standalone Proxy-ARP prerequisites. Refer to [Section 8.1, “Proxy-ARP Prerequisites,”](#) on page 1190.

### 8.2.2.6 Managing High-Availability Proxy-ARP Groups

➤ *To create and add systems to a subnet:*

**Step 1.** Log into the system from where you are creating the subnet.

**Step 2.** Create a new Proxy-ARP group using the command `proxy-arp ha <group-name> ip <ip_addr> <mask>`. Run:

```
GatewayA [standalone: master] (config) # proxy-arp ha my-group ip 10.10.10.10 /24
GatewayA [my-group: master] (config) #
```



You must run the command `proxy-arp ha <group-name> ip <ip_addr> <mask>` **only once** per Proxy-ARP group.



The group IP is used to as a single point for gateway configuration and monitoring the subnet's running status (by running "show" commands).

**Step 3.** Log into the system that you are going to join to the new created Proxy-ARP group.

**Step 4.** Join another system to the Proxy-ARP group, using the command `proxy-arp ha <group-name>`. Run:

```
GatewayB [standalone: master] (config) # proxy-arp ha my-group
GatewayB[my-group: standby] (config) #
```

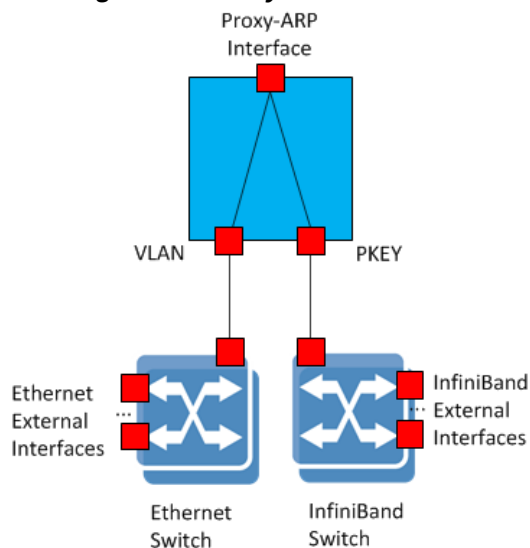
Once a Proxy-ARP HA group is created, the first member maintains its configuration. Configuration of the Proxy-ARP HA may then be performed to suit the subnet needs. When new nodes join the group, the configuration is duplicated to them.

A new node joining a group should serve all the interfaces. For each interface addition, set the Member IP addresses using the command `interface proxy-arp <pra-id> ha member <hostname> ip address <ip-address>`.

Removing a member from an active Proxy-ARP group must be done using the command `no proxy-arp ha` from the box management interface.

### 8.2.3 Proxy-ARP Interface

Proxy-ARP is a logical interface which owns the IP address, VLAN and PKEY values of the subnet.

**Figure 42: Proxy-ARP Interface**

The Proxy-ARP interface has the following attributes:

**Table 56 - Proxy-ARP Interface Attributes**

| Parameter         | Description                                               | Scope            | Access |
|-------------------|-----------------------------------------------------------|------------------|--------|
| Admin state       | Enables or disables the interface                         | Interface        | RW     |
| Operational state | Shows the operational state of the interface (up or down) | Interface member | RO     |
| Description       | Sets an alias text to the interface                       | Interface        | RW     |
| IP address        | IP address                                                | Interface member | RW     |
| IP netmask        | Network prefix mask                                       | Interface        | RW     |
| GUID              | Interface GUID                                            | Interface member | RO     |
| MTU               | Maximum transmission unit                                 | Interface        | RW     |
| VLAN              | VLAN value                                                | Interface        | RW     |
| PKEY              | PKEY value                                                | Interface        | RW     |
| Counters admin    | Enables a set of counters on the interface                | Interface        | RW     |
| Set of counters   | Interface counters                                        | Interface member | RO     |
| Priority          | Interface member priority                                 | Interface member | RW     |
| HA timers         | Timers the control Proxy-ARP HA behavior                  | Interface member | RW     |
| Multicast routes  | Multicast                                                 | Interface        | RW     |

## 8.2.4 Proxy-ARP Resources

### 8.2.4.1 Proxy-ARP Unicast Resources

The resources available for UC Proxy-ARP as a standalone box or HA with Active-Standby load balancing are as follows:

- Number of UC routes – 160
- Number of Ethernet ARP entries – 512
- Number of InfiniBand ARP entries – 3520

The resources available for UC Proxy-ARP as HA IB based IP mode with Active-Active load balancing are as follows:

- Number of UC routes – 160
- Number of Ethernet ARP entries – 512
- Number of InfiniBand ARP entries – 3520 times the number of nodes in the Gateway HA Group

### 8.2.4.2 Proxy-ARP Multicast Resources

The resources available for MC Proxy-ARP as standalone box or HA Active-Standby load balancing are as follows:

- Number of UC routes – 160
- Number of Ethernet ARP entries – 128
- Number of InfiniBand ARP entries – 1024
- Number of MC routes – 2500

The resources available for MC Proxy-ARP as HA IB based IP mode with Active-Active load balancing are as follows:

- Number of UC routes – 160
- Number of Ethernet ARP entries – 128
- Number of InfiniBand ARP entries – 1024 times number of nodes in Gateway HA group
- Number of MC routes – max (2500 times the number of nodes in Gateway HA group = 3072)



Due to a resource limitation in the number of sockets that can be opened, the number of static MC groups that can be configured while in a cluster has been limited to 600. In other words, if more than 600 static MC groups are configured on the switch, and the user attempts to join a cluster, the operation fails.

## 8.3 Proxy-ARP Configuration

### 8.3.1 Proxy-ARP Mode Configuration

➤ *To transition from unicast to multicast:*

```
switch [standalone: master] (config) # proxy-arp mode multicast

Warning! All proxy-arp interfaces configuration is going to be deleted.
Type 'yes' to confirm mode change: yes

switch [standalone: master] (config) # show proxy-arp mode
Proxy-arp mode: multicast
Resource Total

ETH hosts 128
IB hosts 1024
Unicast routes 160
Multicast routes 2500
```

➤ *To transition from multicast to unicast:*

```
switch [standalone: master] (config) # proxy-arp mode unicast

Warning! All proxy-arp interfaces configuration is going to be deleted.
Type 'yes' to confirm mode change: yes

switch [standalone: master] (config) # show proxy-arp mode
Proxy-arp mode: unicast
Resource Total

ETH hosts 512
IB hosts 3520
Unicast routes 160
Multicast routes 0
```

### 8.3.2 Standalone Proxy-ARP Configuration

➤ *To configure Proxy-ARP in the system:*

**Step 1.** Make sure the prerequisites conditions are met. Verify that gateway is supported as part of the system capabilities. Run:

```
switch [standalone: master] (config)# show system capabilities
IB: Supported
Ethernet: L3
GW: Supported
Max SM nodes:648
Ethernet Max licensed speed: 40Gbps
IB max licensed speed: FDR
switch [standalone: master] (config)#
```

**Step 2.** Set Proxy-ARP mode. Run:

```
switch [standalone: master] (config)# proxy-arp mode multicast
```





Proxy-ARP mode is unicast by default. This step should only be performed if you wish to configure multicast routes.

**Step 3.** Enable Proxy-ARP. Run:

```
switch [standalone: master] (config)# ip proxy-arp
```

**Step 4.** Create a Proxy-ARP interface. Run:

```
switch [standalone: master] (config)# interface proxy-arp 1
switch [standalone: master] (config interface proxy-arp 1)#
```

**Step 5.** Set an IP address and network mask to the Proxy-ARP interface. Run:

```
switch [standalone: master] (config interface proxy-arp 1)# ip address
20.20.20.20
switch [standalone: master] (config interface proxy-arp 1)# ip netmask /24
```



Each Proxy-ARP interface must have a unique IP subnet.



The Proxy-ARP interface IP must be on a different IP subnet than that of the management interfaces.

**Step 6.** Create a VLAN. Run:

```
switch [standalone: master] (config)# vlan 10
switch [standalone: master] (config vlan 10)# exit
```

**Step 7.** Add a VLAN to the interface. Run:

```
switch [standalone: master] (config interface proxy-arp 1)# ip vlan 10
```

**Step 8.** Add a PKEY to the interface. Run:

```
switch [standalone: master] (config interface proxy-arp 1)# ip pkey 0x7fff
```



Each Proxy-ARP interface must have a unique VLAN/PKEY pair.

**Step 9.** Enable the Proxy-ARP interface. Run:

```
switch [standalone: master] (config interface proxy-arp 1)# no shutdown
```

**Step 10.** Make sure one of the Ethernet or port-channel ports are configured with VLAN 10 and that the Proxy-ARP part of the VLAN is operationally up. For example:

```
switch [standalone: master] (config interface ethernet 1/1)# switchport access
vlan 10
switch [standalone: master] (config interface ethernet 1/1)# show interfaces
proxy-arp 1
```

```

Proxy-arp 1
 Admin state: Enabled
 Operational state: Up
 GUID: 00:02:C9:03:00:66:08:63
 Internet Address: 20.20.20.20/24
 Broadcast Address: 20.20.20.255
 Description: N/A
 MTU: 1500
 Counters: Disabled
 Member interfaces: vlan 10, pkey 0x7fff
switch (config)#

```

**Step 11.** (Optional) Configure a route to the default gateway in the subnet. Run:

```

switch [standalone: master] (config interface proxy-arp 1)# ip route default
20.20.20.254

```



The default gateway configuration is not used for management purposes.

**Step 12.** (Optional) Configure a multicast route. While in Proxy-ARP multicast mode, run:

```

switch [standalone: master] (config interface proxy-arp 1)# ip multicast
237.0.1.5

```

➤ **To verify the Proxy-ARP configuration:**

**Step 1.** Display the Proxy-ARP interface configuration. Run:

```

switch [standalone: master] (config)# show interfaces proxy-arp 1
Proxy-arp 1
 Admin state: Enabled
 Operational state: Up
 GUID: 00:02:C9:03:00:66:08:63
 Internet Address: 20.20.20.20/24
 Broadcast Address: 20.20.20.255
 Description: N/A
 MTU: 1500
 Counters: Disabled
 Member interfaces: vlan 10, pkey 0x7fff
switch [standalone: master] (config)#

```

**Step 2.** Display the Proxy-ARP brief status. Run:

```

switch [standalone: master] (config)# show interfaces proxy-arp brief
Interface Description State Member interfaces

Proxy-arp 1 N/A Up vlan 10, pkey 0x7fff
switch [standalone: master] (config)#

```

**Step 3.** Display the routing table. Run:

```
switch [standalone: master] (config) # show ip route interface proxy-arp 1
Destination Mask Gateway Interface Source Distance/Metric
20.20.20.0 255.255.255.0 0.0.0.0 proxy-arp 1 kernel 0/0
default 0.0.0.0 20.20.20.254 proxy-arp 1 static 0/0
switch [standalone: master] (config) #
```

**Step 4.** Display the multicast routing table. Run:

```
switch [standalone: master] (config) # show ip multicast interface proxy-arp 1
Proxy-arp 1 multicast list:

Total number of entries: 5

Address Interface Source

224.0.0.1 proxy-arp 2 Dynamic
224.0.0.2 proxy-arp 2 Dynamic
237.0.1.5 proxy-arp 2 Static
239.0.0.77 proxy-arp 2 Dynamic
255.255.255.255 proxy-arp 2 Dynamic
switch [standalone: master] (config) #
```

### 8.3.3 High Availability Proxy-ARP Configuration

➤ *Configure the following on GatewayA:*

```
ssh admin@10.10.10.11
GatewayA [standalone: master] (config)# vlan 10
GatewayA [standalone: master] (config vlan 10)# exit
GatewayA [standalone: master] (config)# interface ethernet 1/1 switchport
access vlan 10
GatewayA [standalone: master] (config)# proxy-arp mode unicast force
GatewayA [standalone: master] (config)# ip proxy-arp
GatewayA [standalone: master] (config)# proxy-arp ha my-group ip 10.10.10.10
255.255.255.0
GatewayA [my-group: master] (config)
```

➤ *Configure the following on GatewayB:*

```
ssh admin@10.10.10.12
GatewayB [standalone: master](config)# vlan 10
GatewayB [standalone: master] switch (config vlan 10)# exit
GatewayB [standalone: master](config)# interface ethernet 1/1 switchport
access vlan 10
GatewayB [standalone: master](config)# proxy-arp mode unicast force
GatewayB [standalone: master](config)# ip proxy-arp
GatewayB [standalone: master](config)# proxy-arp ha my-group
GatewayB [my-group: standby] (config)
```



The user must make sure all gateway nodes are running with either multicast or unicast mode.

➤ **Configure the following on the VIP:**

```
ssh admin@10.10.10.10
GatewayA [my-group: master] (config)# interface proxy-arp 1
GatewayA [my-group: master] (config interface proxy-arp 1)# ip netmask /24
GatewayA [my-group: master] (config interface proxy-arp 1)# ip vlan 10
GatewayA [my-group: master] (config interface proxy-arp 1)# ip pkey 0x7fff
GatewayA [my-group: master] (config interface proxy-arp 1)# ha member GatewayA
ip address 20.20.20.20
GatewayA [my-group: master] (config interface proxy-arp 1)# ha member GatewayB
ip address 20.20.20.21
GatewayA [my-group: master] (config interface proxy-arp 1)# no shutdown
GatewayA [my-group: master] (config interface proxy-arp 1)# ip route default
10.10.10.250
GatewayA [my-group: master] (config interface proxy-arp 1)# ip multicast
200.0.1.5
```



The IP address of the HA member must not be the IP of the management interface. It should be on a different IP subnet. The HA group IP, however, should be the same IP subnet of the management IP of the system.

➤ **To verify the Proxy-ARP configuration on the VIP:**

```
GatewayA [my-group: master] (config) # show interfaces proxy-arp 1 ha

Proxy-arp 1
 Keep Alive loss threshold: 1
 Keep Alive loss interval: 120 seconds
 Load balancing algorithm: ib-base-ip
 IP masklen: 24
 Admin state: Enabled
 MTU: 1500
 Counters: Disabled
 Bridged interfaces: vlan 10, pkey 0x7fff
 Number of members: 2
 Hostname Description Admin State LB State Operational State IP Priority

 GatewayA host1-dscr Enabled Active Up 20.20.20.20 100
 GatewayB host2-dscr Enabled Active Up 20.20.20.21 100

GatewayA [my-group: master] (config) # show proxy-arp ha
Load balancing: ib-base-ip
Number of Proxy-ARP interfaces: 1

Proxy Arp VIP:
=====
Proxy-arp group name: my-group
HA VIP address: 10.10.10.10/24
Active nodes: 2
Hostname State IP Address

GatewayA master 10.10.10.11
GatewayB standby 10.10.10.12
GatewayA [my-group: master] (config) #
```

➤ **To change the hostname in an active Proxy-ARP HA cluster:**

- Step 1.** Remove Proxy-ARP member configuration related to the switch with the hostname to be renamed.
- Step 2.** Add Proxy-ARP member configuration related to the switch with the new hostname to be configured.
- Step 3.** Wait until load balancing is distributed to all members but this switch.
- Step 4.** Change the switch hostname.
- Step 5.** Save configuration.
- Step 6.** Verify load balancing is distributed to all members.

For example, assuming GatewayA and GatewayB are members of “my-group” and we wish to change GatewayB’s name to GatewayC.

➤ **To create the setup:**

- Step 1.** Connect via interface management of GatewayA. Run:

```
GatewayA [standalone: master] (config) # proxy-arp mode unicast force
GatewayA [standalone: master] (config) # ip proxy-arp
GatewayA [standalone: master] (config) # proxy-arp ha my-group ip 10.10.10.10 /24
GatewayA [my-group: master] (config) #
```

- Step 2.** Connect via interface management of GatewayB. Run:

```
GatewayB [standalone: master] (config) # proxy-arp mode unicast force
GatewayB [standalone: master] (config) # ip proxy-arp
GatewayB [standalone: master] (config) # proxy-arp ha my-group
GatewayB [my-group: standby] (config) #
```

- Step 3.** Connect via VIP. Run:

```
GatewayA [my-group: master] (config)# interface proxy-arp 1 netmast /24
GatewayA [my-group: master] (config)# interface proxy-arp 1 ha member GatewayA ip
20.20.20.20
GatewayA [my-group: master] (config)# interface proxy-arp 1 ha member GatewayB ip
20.20.20.21
GatewayA [my-group: master] (config)# no interface proxy-arp 1 shutdown
```

➤ **To change the hostname from GatewayB to GatewayC:**

- Step 1.** Delete GatewayB member configuration. Connect via VIP. Run:

```
GatewayA [my-group: master] (config) # no interface proxy-arp 1 ha member GatewayB
```

- Step 2.** Configure GatewayC member configuration. Connect via VIP. Run:

```
GatewayA [my-group: master] (config) # interface proxy-arp 1 ha member GatewayC ip
20.20.20.22
```

- Step 3.** Connect through the GatewayB management interface IP, and change the hostname. Run:

```
GatewayB [my-group: standby] (config) # hostname GatewayC
GatewayC [my-group: standby] (config) #
```

## 8.4 Advanced Settings

### 8.4.1 Default Gateway

It is recommended to configure a route to the default gateway in the subnet. If the default gateway is not configured, unregistered unicast traffic is dropped.

### 8.4.2 vTCA Interface

A virtual Target Channel Adapter (vTCA) is an end-point of InfiniBand fabric. Gateway needs a vTCA enabled on the switch in order to function (SMA port #37).

The vTCA is available in VPI single switch mode and when Proxy ARP is enabled.

The vTCA interface is enabled by default. However, if the SM disables this interface, it can be re-enabled by running the following command:

```
switch (config)# no sma port 1 shutdown
switch (config)# show sma port 1
Enabled
switch (config)#
```

When using InfiniBand tools such as iblinkinfo, smpquery, or ibnetdiscover the user is able to see the status of the vTCA interface.

```
iblinkinfo
...
6 37[]==(4X 14.0625 Gbps Active/LinkUp)==> 7 1[] "Mellanox vTCA switch-626a54"
()
...
#
smpquery -D pi 0 1 37
Port info: DR path slid 65535; dlid 65535; 0 port 1
...
CapMask:.....0x251486a
 IsSM
 IsTrapSupported
 IsAutomaticMigrationSupported
 IsSLMappingSupported

 IsSystemImageGUIDsupported
 IsExtendedSpeedsSupported
 IsCommunicationManagementSupported
 IsVendorClassSupported
 IsCapabilityMaskNoticeSupported
 IsClientRegistrationSupported

...
...
LinkState:.....Active
PhysLinkState:.....LinkUp
...
...
#
```

```
ibnetdiscover
#
Topology file: generated on Tue Jan 29 15:08:32 2013
#
Initiated from node 0002c903003531b0 port 0002c903003531b1

...
...
Ca 1 "H-0002c903006cc4f2" # "Mellanox vTCA switch-626a54"
[1](2c903006cc4f2) "S-0002c903006cc4f1"[37] # lid 7 lmc 0
"MF0;switch-626a54:SX1036/U1" lid 6 4xFDR

vendid=0x2c9
devid=0x1003
sysimgguid=0x2c90300431cd3
caguid=0x2c90300431cd0
...
...

#
```

### 8.4.3 MTU

Make sure that the InfiniBand subnet MTU is similar to the Ethernet subnet MTU. In most cases the default the MTU is 1500 bytes for Ethernet subnets while 4K in InfiniBand. Run:

```
switch (config)# interface ethernet 1/1 mtu 4000
switch (config)# interface ib 1/10 mtu 4000
switch (config)# interface proxy-arp 1 mtu 4000
```



Proxy-ARP MTU is limited to 4092.

## 8.5 Commands

### 8.5.1 Config

#### ip proxy-arp

**ip proxy-arp**  
**no ip proxy-arp**

Enables Proxy-ARP feature.  
 The no form of the command disables Proxy-ARP feature.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | IP Proxy-ARP is disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | switch (config) # ip proxy-arp<br>switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Commands</b>   | show ip proxy-arp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The command “ip proxy arp” can be enabled only if the following features are disabled:               <ul style="list-style-type: none"> <li>•ip routing</li> <li>•ip igmp snooping</li> <li>•ib sm</li> </ul> </li> <li>When IP Proxy-ARP is disabled the user is still able to configure Proxy-ARP but it only takes affect when Proxy-ARP is enabled. The no form of the command does not delete Proxy-ARP configuration.</li> <li>This command is not available on VIP.</li> <li>The no form of the command is not available when the box is in an HA group. The user should first leave the group (“no proxy-arp ha &lt;my-group&gt;”) and then use the no form of the command.</li> </ul> |



## proxy-arp mode

**proxy-arp mode {unicast | multicast} [force]**  
**no proxy-arp mode [force]**

Configures IP Proxy-ARP to work in either unicast or multicast mode.  
 The no form of the command resets this parameter to its default.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Syntax Description</b> | unicast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Configures unicast mode            |
|                           | multicast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Configures multicast mode          |
|                           | force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Forces configuration on the system |
| <b>Default</b>            | unicast                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                    |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                    |
| <b>Example</b>            | <pre>switch (config) # proxy-arp mode unicast switch (config) # show proxy-arp mode Proxy-arp mode: unicast Resource Total ----- Unicast routes      512 ETH hosts           512 IB hosts            3520 ETH MC routes       128 IB MC routes        64</pre>                                                                                                                                                                                                                                                                                                          |                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• The difference between unicast and multicast mode is in the hardware resource allocation.</li> <li>• The command is only available when IP Proxy-ARP is disabled.</li> <li>• The command is only available from the box IP.</li> <li>• The force parameter in the no form of the command bypasses the confirmation prompt</li> <li>• All Proxy-ARP configurations is deleted upon Proxy-ARP mode change. The user is prompted with a warning message informing him of this, and is required to confirm the command.</li> </ul> |                                    |

## interface proxy-arp

**interface proxy-arp <pra-id>[-<pra-id>]**  
**no interface proxy-arp <pra-id>[-<pra-id>]**

Creates a Proxy-ARP interface, and enters a new configuration mode.  
 The no form of the command deletes the interface configuration.

|                           |                                                                                                                                                                                                                                                                                                                                                                    |                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>Syntax Description</b> | pra-id                                                                                                                                                                                                                                                                                                                                                             | A Proxy-ARP interface ID. Range: 1-128.              |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                |                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                             |                                                      |
| <b>History</b>            | 3.3.0000                                                                                                                                                                                                                                                                                                                                                           | First version                                        |
|                           | 3.3.4302                                                                                                                                                                                                                                                                                                                                                           | Updated Proxy-ARP interface limitation in Note field |
|                           | 3.3.4402                                                                                                                                                                                                                                                                                                                                                           | Added HA note                                        |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                           | Added range option                                   |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                              |                                                      |
| <b>Example</b>            | <pre>switch (config) # interface proxy-arp 5-7 switch (config interface proxy-arp 5-7) # exit switch (config) # interface proxy-arp 1 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                |                                                      |
| <b>Related Commands</b>   | <pre>show interfaces proxy-arp show interfaces proxy-arp brief</pre>                                                                                                                                                                                                                                                                                               |                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Up to 32 Proxy-ARP interfaces can be created.</li> <li>This command is only available on the master (standalone or Proxy-ARP HA group master) and via VIP.</li> <li>When in the configuration mode of multiple Proxy-ARP interfaces, any configuration performed is applied on all interfaces within that range.</li> </ul> |                                                      |

## proxy-arp ha

**proxy-arp ha <group-name> [ip <ip-address> <ipv-mask> [force]]**  
**no proxy-arp ha**

Creates a Proxy-ARP group or maps the system to an existing group.  
 The no form of the command removes the system from the Proxy-ARP group.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | group-name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 64B string of the Proxy-ARP group name.                                                                              |
|                           | ip <ip-address> <ipv-mask>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sets the VIP and mask of the Proxy-ARP group. The mask is IPv4 and can be in the format of "255.255.255.0" or "/24". |
|                           | force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Forces the Proxy-ARP IP configuration when executing from a group member that is not the master.                     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                      |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                      |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | First version                                                                                                        |
|                           | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Updated Note section                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                      |
| <b>Example</b>            | switch (config) # proxy-arp ha my-group ip 10.10.10.10 /24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                      |
| <b>Related Commands</b>   | show proxy-arp ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The VIP must be in the management interface's subnet.</li> <li>The command fails if the switch is already a member of a Proxy-ARP group, or if there is not at least one active member of the Proxy-ARP group currently active on the management network</li> <li>Once configuring this feature, the user should connect to the switch via this VIP to configure Proxy-ARP</li> <li>This command is applicable via management box IP only</li> <li>This command is only available when Proxy-ARP mode is unicast</li> <li>Leaving a Proxy-ARP group prompts the message: "Member &lt;member-name&gt; has been removed from all configured proxy-arp interfaces"</li> </ul> |                                                                                                                      |

## proxy-arp ha lb-algorithm

**proxy-arp ha lb-algorithm <type>**

**no proxy-arp ha lb-algorithm**

Configures the load balancing algorithm.

The no form of the command resets the value to its default value.

|                           |                                                                                     |                                                                                                                                                                                                                                                                                                |
|---------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | type                                                                                | Possible load-balancing algorithms. Possible values are: <ul style="list-style-type: none"> <li>activity-standby – active/standby HA scheme. Only one switch passes traffic.</li> <li>ib-base-ip – load balancing based on the InfiniBand host's IP address (source or destination)</li> </ul> |
| <b>Default</b>            | ib-base-ip                                                                          |                                                                                                                                                                                                                                                                                                |
| <b>Configuration Mode</b> | Config                                                                              |                                                                                                                                                                                                                                                                                                |
| <b>History</b>            | 3.3.4402                                                                            |                                                                                                                                                                                                                                                                                                |
| <b>Role</b>               | admin                                                                               |                                                                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # proxy-arp ha lb-algorithm ib-base-ip switch (config) #</pre> |                                                                                                                                                                                                                                                                                                |
| <b>Related Commands</b>   | show proxy-arp ha                                                                   |                                                                                                                                                                                                                                                                                                |
| <b>Note</b>               | This command is only available on the Proxy-ARP HA group master and via VIP.        |                                                                                                                                                                                                                                                                                                |

## sma port

**sma port <number> shutdown**  
**no sma port <number> shutdown**

Disables the SMA on virtual TCA.  
 The no form of the command enables the SMA on virtual TCA.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Syntax Description</b> | number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SMA port number. |
| <b>Default</b>            | SMA port 1 is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| <b>Configuration Mode</b> | Config                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
| <b>History</b>            | 3.3.0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |
| <b>Example</b>            | switch (config) # sma port 1 shutdown<br>switch (config) #                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |
| <b>Related Commands</b>   | show sma port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• This port must be enabled for gateway functionality. In case the SM disabled this port via MAD interface, this command provides the administrator the ability to re-enable it back (without the need to reload the switch).</li> <li>• SMA ports are currently limited to only one port</li> <li>• In regular operation there is no need to change the configuration of this parameter</li> <li>• This command is applicable via management box IP only.</li> </ul> |                  |

## 8.5.2 Interface Proxy-ARP

### ip address

**ip address <ip-address>**  
**no ip address**

Sets IP address for this interface.  
 The no form of the command sets the ip address to 0.0.0.0.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <b>Syntax Description</b> | ip-address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | IP address.                |
| <b>Default</b>            | 0.0.0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
| <b>History</b>            | 3.3.3000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | First version              |
|                           | 3.3.4100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Removed “prefix” parameter |
|                           | 3.3.4302                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Added note                 |
|                           | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Added HA note              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ip-address 10.10.10.10 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• The no form of the command does not affect the mask</li> <li>• The subnets of different Proxy-ARP interfaces must not overlap or conflict with one another</li> <li>• If the IP address is set to 0.0.0.0 traffic is not forwarded by the Proxy-ARP. The IP address must be set before Ethernet-InfiniBand or InfiniBand-Ethernet traffic is passed.</li> <li>• When Proxy-ARP HA is enabled, the command is accessible from VIP. When Proxy-ARP HA is disabled, the command is accessible from the box management interface.</li> </ul> |                            |

## ip netmask

**ip netmask <mask>**

**no ip netmask**

Sets mask length for the IP address.

The no form of the command resets this parameter to its default value.

|                           |                                                                                                                                                                                                                                                                    |                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | mask                                                                                                                                                                                                                                                               | The IP mask. Input format can be x.y.z.w (e.g. 255.255.255.0), or mask length (range 0-32) may be provided (e.g. /24). |
| <b>Default</b>            | 0                                                                                                                                                                                                                                                                  |                                                                                                                        |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                         |                                                                                                                        |
| <b>History</b>            | 3.3.4100                                                                                                                                                                                                                                                           | First version                                                                                                          |
|                           | 3.3.4402                                                                                                                                                                                                                                                           | Added HA note                                                                                                          |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                              |                                                                                                                        |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ip netmask /24 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                          |                                                                                                                        |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                    |                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• Make sure the IP address is configured using the command “ip address”</li> <li>• This command only configures the subnet mask</li> <li>• If Proxy-ARP VIP is used this command is applicable via the VIP only.</li> </ul> |                                                                                                                        |

## ip vlan

**ip vlan <vlan-id>**

**no ip vlan**

Sets the VLAN number.

The no form of the command deletes the VLAN.

|                           |                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Syntax Description</b> | vlan-id                                                                                                                                                                                                                                                                                                                                                                                   | 12-bit VLAN ID. The range: [1-4094]. |
| <b>Default</b>            | No VLAN is configured                                                                                                                                                                                                                                                                                                                                                                     |                                      |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                                                |                                      |
| <b>History</b>            | <p>3.3.4000</p> <p>3.3.4100                      Added ability to edit VLAN ID.</p> <p>3.3.4302                      Updated Note field</p> <p>3.3.4402                      Added HA note</p>                                                                                                                                                                                            |                                      |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                     |                                      |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ip vlan 10 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                                                                                                                     |                                      |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                           |                                      |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>VLAN must be configured on the Ethernet interface to enable gateway functionality.</li> <li>Each Proxy-ARP interface must have a unique VLAN/PKEY pair. Trying to map the same VLAN/PKEY to a different Proxy-ARP interface results in an error message.</li> <li>If Proxy-ARP VIP is used this command is applicable via the VIP only.</li> </ul> |                                      |



## ip pkey

**ip pkey <pkey>**  
**no ip pkey**

Sets the PKEY number (InfiniBand partition).  
 The no form of the command deletes the PKEY.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | pkey                                                                                                                                                                                                                                                                                                                                                                                                        | The range is [0x1 – 0x7fff]. Partition value can be specified as a base 10 number or a hexa value (with “0x” prefix). |
| <b>Default</b>            | No PKEY is configured                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                       |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                       |
| <b>History</b>            | 3.3.4000                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       |
|                           | 3.3.4100                                                                                                                                                                                                                                                                                                                                                                                                    | Added ability to edit PKEY number.                                                                                    |
|                           | 3.3.4302                                                                                                                                                                                                                                                                                                                                                                                                    | Updated Note field                                                                                                    |
|                           | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                    | Added HA note                                                                                                         |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                       |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ip pkey 0x7fff switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                                                                                                                                   |                                                                                                                       |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The PKEY value is always reported in hexadecimal values via the command “show interfaces proxy-arp”.</li> <li>Each Proxy-ARP interface must have a unique VLAN/PKEY pair. Trying to map the same VLAN/PKEY to a different Proxy-ARP interface results in an error message.</li> <li>If Proxy-ARP VIP is used this command is applicable via the VIP only.</li> </ul> |                                                                                                                       |

## ip route

**ip route** <ip-address/prefix> <next-hop-ip-address>  
**no ip route** [<ip-address/prefix>]

Adds a static route via this interface.

The no form of the command deletes a specified IP route or all IP routes for this interface.

|                    |                                                                                                                                                                                                                          |                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Syntax Description | ip-address/prefix                                                                                                                                                                                                        | IP address and network prefix (for example, 10.10.10.0/24)             |
|                    | next-hop-ip-address                                                                                                                                                                                                      | The next hop IP address for this route – the default router IP address |
| Default            | N/A                                                                                                                                                                                                                      |                                                                        |
| Configuration Mode | Config Interface Proxy-ARP                                                                                                                                                                                               |                                                                        |
| History            | 3.3.4000                                                                                                                                                                                                                 | First version                                                          |
|                    | 3.3.4302                                                                                                                                                                                                                 | Added static routes note                                               |
|                    | 3.3.4402                                                                                                                                                                                                                 | Added HA note                                                          |
|                    | 3.4.0000                                                                                                                                                                                                                 | Updated no form                                                        |
| Role               | admin                                                                                                                                                                                                                    |                                                                        |
| Example            | switch (config interface proxy-arp 1) # ip route 10.10.10.0/24 10.10.10.254                                                                                                                                              |                                                                        |
| Related Commands   |                                                                                                                                                                                                                          |                                                                        |
| Note               | <ul style="list-style-type: none"><li>160 static routes can be configured altogether allocated for the 32 Proxy-ARP interfaces.</li><li>If Proxy ARP VIP is used, this command is applicable via the VIP only.</li></ul> |                                                                        |

## ip route default

**ip route default <next-hop-ip-address>**  
**no ip route default <next-hop-ip-address>**

Adds a default static route via this interface.  
 The no form of the command deletes the default static route.

|                           |                                                                                                                          |                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Syntax Description</b> | next-hop-ip-address                                                                                                      | The next hop IP address for this route – the default router IP address |
| <b>Default</b>            | N/A                                                                                                                      |                                                                        |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                               |                                                                        |
| <b>History</b>            | 3.3.0000                                                                                                                 | First version                                                          |
|                           | 3.3.4402                                                                                                                 | Added HA note                                                          |
| <b>Role</b>               | admin                                                                                                                    |                                                                        |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ip route default 10.10.10.254 switch (config interface proxy-arp 1) #</pre> |                                                                        |
| <b>Related Commands</b>   |                                                                                                                          |                                                                        |
| <b>Note</b>               | If Proxy ARP VIP is used, this command is applicable via the VIP only.                                                   |                                                                        |

## description

**description** <string>

**no description**

Sets a user-defined string for the description.

The no form of the command sets the parameter to default.

|                           |                                                                                                                       |                                                          |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Syntax Description</b> | string                                                                                                                | 40B string of user-defined description for the interface |
| <b>Default</b>            | "" (empty string)                                                                                                     |                                                          |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                            |                                                          |
| <b>History</b>            | 3.3.0000                                                                                                              | First version                                            |
|                           | 3.3.4402                                                                                                              | Added HA note                                            |
|                           | 3.4.0000                                                                                                              | Updated note                                             |
| <b>Role</b>               | admin                                                                                                                 |                                                          |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # description my-description switch (config interface proxy-arp 1) #</pre> |                                                          |
| <b>Related Commands</b>   |                                                                                                                       |                                                          |
| <b>Note</b>               | If Proxy ARP VIP is used, this command is applicable via the VIP only.                                                |                                                          |

## shutdown

**shutdown**  
**no shutdown**

Disables the interface.  
 The no form of the command enables the interface.

|                           |                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                            |
| <b>Default</b>            | Disabled                                                                                       |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                     |
| <b>History</b>            | 3.3.0000 First version                                                                         |
|                           | 3.3.4402 Added HA note                                                                         |
| <b>Role</b>               | admin                                                                                          |
| <b>Example</b>            | switch (config interface proxy-arp 1) # no shutdown<br>switch (config interface proxy-arp 1) # |
| <b>Related Commands</b>   |                                                                                                |
| <b>Note</b>               | If Proxy-ARP VIP is used this, command is applicable via VIP only.                             |

## mtu

**mtu <value>**

**no mtu**

Sets the MTU of the interface.

The no form of the command sets the MTU to default.

|                           |                                                                                                     |                                        |
|---------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Syntax Description</b> | value                                                                                               | The MTU value. Range: 1500-4092 bytes. |
| <b>Default</b>            | 1500                                                                                                |                                        |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                          |                                        |
| <b>History</b>            | 3.3.4000                                                                                            | First version                          |
|                           | 3.3.4402                                                                                            | Added HA note                          |
| <b>Role</b>               | admin                                                                                               |                                        |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # mtu 2044 switch (config interface proxy-arp 1) #</pre> |                                        |
| <b>Related Commands</b>   |                                                                                                     |                                        |
| <b>Note</b>               | If Proxy-ARP VIP is used, this command is applicable via VIP only.                                  |                                        |

## counters

**counters**  
**no counters**

Enables counters on this interface.  
 The no form of the command disables counters on this interface.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>            | Counters are disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>History</b>            | <div>3.3.4000 First version</div> <div>3.3.4302 Added note</div> <div>3.3.4402 Added HA note</div>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # counters switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The system is limited in the number of L3 counters, not all interfaces may have counters enabled</li> <li>To see counters on the interface you need first to enable counters by this command</li> <li>Counters are supported on up to 12 Proxy-ARP interfaces simultaneously. Enabling counters on more than 12 interfaces is allowed, but results in warnings in the log and causes uncertain behavior.</li> <li>If Proxy ARP VIP is used, this command is applicable via VIP only.</li> </ul> |

## clear counters

### clear counters

Clears interface counters.

|                           |                                                                                                                                                                                                                                                         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                     |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                     |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                              |
| <b>History</b>            | 3.3.4000 First version                                                                                                                                                                                                                                  |
|                           | 3.3.4402 Added HA note                                                                                                                                                                                                                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                   |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # clear counters switch (config interface proxy-arp 1) #</pre>                                                                                                                                               |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                         |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If the command is running from the VIP it cleans the counters from all Proxy-ARP group members.</li> <li>• If the command is running from the box IP it clears only the specific member's counters.</li> </ul> |



## ha table-update-interval

**ha table-update-interval <seconds>**

**no ha table-update-interval**

Sets the time the standby table is considered valid.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                         |                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                 | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 120                                                                                                                     |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                              |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                |                                  |
| <b>Role</b>               | admin                                                                                                                   |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha table-update-interval 120 switch (config interface proxy-arp 1) #</pre> |                                  |
| <b>Related Commands</b>   |                                                                                                                         |                                  |
| <b>Note</b>               | If Proxy-ARP VIP is used, this command is applicable via VIP only.                                                      |                                  |

## ha table-fast-learn-time

**ha table-fast-learn-time <seconds>**

**no ha table-fast-learn-time**

Sets the time a new master (after the previous master failed) waits before forwarding the load balancing vector to the other (non-master) nodes in the system.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                        | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 1                                                                                                                                                                                                                              |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                     |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                       |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                          |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha table-fast-learn-time 1 switch (config interface proxy-arp 1) #</pre>                                                                                                          |                                  |
| <b>Related Commands</b>   | ha master-election-learn-interval                                                                                                                                                                                              |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This command is only available on the Proxy-ARP HA group master and via VIP.</li> <li>The value of table-fast-learn-time must be smaller than the value of table-learn-time.</li> </ul> |                                  |

## ha master-election-learn-interval

**ha master-election-learn-interval <seconds>**

**no ha master-election-learn-interval**

Sets the time a new Proxy-ARP group master stays in learning mode waiting for an advertisement to be received.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                              |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                                                                                                                                                      | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 30                                                                                                                                                                                                                                                                                                                                                           |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                   |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                     |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                        |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha master-election-learn-inter- val 30 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                                                            |                                  |
| <b>Related Commands</b>   | ha table-fast-learn-time                                                                                                                                                                                                                                                                                                                                     |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>Once this timer expires, this node becomes the Proxy-ARP group master if no master advertisements are received.</li> <li>If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>The value of master-election-learn-interval must be greater than the value of advertisement-interval.</li> </ul> |                                  |

## ha advertisement-interval

**ha advertisement-interval <seconds>**

**no ha advertisement-interval**

Sets the time between keepalive messages (sent by the standby node) and master advertisement messages (sent by the master node).

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                         |                                  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                                 | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 1                                                                                                                                                                                                                                       |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                              |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                   |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha advertisement-interval 1 switch (config interface proxy-arp 1) #</pre>                                                                                                                  |                                  |
| <b>Related Commands</b>   | ha table-learn-time                                                                                                                                                                                                                     |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>• The value of advertisement-interval must be smaller than the value of master-election-learn-interval.</li> </ul> |                                  |

## ha table-learn-time

**ha table-learn-time <seconds>**

**no ha table-learn-time**

Sets the time a new master (when no previous master is known) waits before forwarding the load balancing vector to the other (non-master) nodes in the system. The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                        | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 30                                                                                                                                                                                                                             |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                     |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                       |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                          |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha table-learn-time 30 switch (config interface proxy-arp 1) #</pre>                                                                                                              |                                  |
| <b>Related Commands</b>   | ha advertisement-interval                                                                                                                                                                                                      |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>This command is only available on the Proxy-ARP HA group master and via VIP.</li> <li>The value of table-learn-time must be greater than the value of table-fast-learn-time.</li> </ul> |                                  |

## ha keep-alive-loss-threshold

**ha keep-alive-loss-threshold <value>**

**no ha keep-alive-loss-threshold**

Sets the number of lost keep alive messages in the keep alive loss interval that cause an alarm to be generated.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                    |                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | value                                                                                                                                                                              | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 10                                                                                                                                                                                 |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                         |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                           |                                  |
|                           | 3.3.4500                                                                                                                                                                           | Updated Note section             |
| <b>Role</b>               | admin                                                                                                                                                                              |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha keep-alive-loss-threshold 10 switch (config interface proxy-arp 1) #</pre>                                                         |                                  |
| <b>Related Commands</b>   | ha keep-alive-loss-interval                                                                                                                                                        |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>The alarm generated is a WARNING message in the log.</li> </ul> |                                  |

## ha keep-alive-loss-interval

**ha keep-alive-loss-interval <seconds>**

**no ha keep-alive-loss-interval**

Sets the time interval during which lost keepalive messages (more than what is configured in “ha keep-alive-loss-threshold”) trigger an alarm.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                    |                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                            | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 120                                                                                                                                                                                |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                         |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                           |                                  |
|                           | 3.3.4500                                                                                                                                                                           | Updated Note section             |
| <b>Role</b>               | admin                                                                                                                                                                              |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha keep-alive-loss-interval 120 switch (config interface proxy-arp 1) #</pre>                                                         |                                  |
| <b>Related Commands</b>   | ha keep-alive-loss-threshold                                                                                                                                                       |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>The alarm generated is a WARNING message in the log.</li> </ul> |                                  |

## ha host-list-diff-update-interval

**ha host-list-diff-update-interval <seconds>**

**no ha host-list-diff-update-interval**

Sets the time to wait after receiving a new host before sending a host list update message to the master.

The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                            |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                                    | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 3                                                                                                                                                                                                                                          |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                 |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                   |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                      |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha host-list-diff-update-interval 3 switch (config interface proxy-arp 1) #</pre>                                                                                                             |                                  |
| <b>Related Commands</b>   | ha host-list-update-interval                                                                                                                                                                                                               |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>• The value of host-list-diff-update-interval must be smaller than the value of host-list-update-interval.</li> </ul> |                                  |



## ha host-list-update-interval

**ha host-list-update-interval <seconds>**

**no ha host-list-update-interval**

Sets the number of seconds non-master nodes send their full host list to the master.  
The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                                                                                                                          |                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Syntax Description</b> | seconds                                                                                                                                                                                                                                                                                                                                                                  | Time in seconds. Range: 1-10000. |
| <b>Default</b>            | 300                                                                                                                                                                                                                                                                                                                                                                      |                                  |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                               |                                  |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                 |                                  |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                    |                                  |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha host-list-diff-update- interval 300 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                                                                                        |                                  |
| <b>Related Commands</b>   | ha host-list-diff-update-interval                                                                                                                                                                                                                                                                                                                                        |                                  |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>• The value of host-list-update-interval must be greater than the value of host-list-diff-update-interval.</li> <li>• It is recommended not to set host-list-update-interval to be less than 2 minutes when working under heavy traffic.</li> </ul> |                                  |

# ha member description

**ha member <hostname> description <text>**  
**no ha member <hostname> description**

Sets a description per member in the Proxy-ARP group.  
The no form of the command resets the parameter to its default value.

|                    |                                                                                                                                                      |                                                           |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Syntax Description | hostname                                                                                                                                             | The member’s hostname                                     |
|                    | text                                                                                                                                                 | User defined description. String range is up to 40 bytes. |
| Default            | “”                                                                                                                                                   |                                                           |
| Configuration Mode | Config Interface Proxy-ARP                                                                                                                           |                                                           |
| History            | 3.3.4402                                                                                                                                             |                                                           |
| Role               | admin                                                                                                                                                |                                                           |
| Example            | switch (config interface proxy-arp 1) # ha member my-member-hostname<br>description my-member-description<br>switch (config interface proxy-arp 1) # |                                                           |
| Related Commands   |                                                                                                                                                      |                                                           |
| Note               | If Proxy-ARP VIP is used, this command is applicable via VIP only.                                                                                   |                                                           |

## ha member ip address

**ha member <hostname> ip address <ip-address>**  
**no ha member <hostname> ip address <ip-address>**

Assigns an IP address to access the instance on this HA member.  
 The no form of the command resets the parameter to its default value.

|                    |                                                                                                                                                                                                                                                                                                                                          |                                 |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Syntax Description | hostname                                                                                                                                                                                                                                                                                                                                 | The member’s hostname           |
|                    | ip-address                                                                                                                                                                                                                                                                                                                               | IPv4 address in a dotted format |
| Default            | 0.0.0.0                                                                                                                                                                                                                                                                                                                                  |                                 |
| Configuration Mode | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                               |                                 |
| History            | 3.3.4402                                                                                                                                                                                                                                                                                                                                 |                                 |
|                    | 3.3.4500                                                                                                                                                                                                                                                                                                                                 | Added a note                    |
| Role               | admin                                                                                                                                                                                                                                                                                                                                    |                                 |
| Example            | switch (config interface proxy-arp 1) # ha member my-member-hostname ip address 10.10.10.10<br>switch (config interface proxy-arp 1) #                                                                                                                                                                                                   |                                 |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                          |                                 |
| Note               | <ul style="list-style-type: none"><li>• If Proxy-ARP VIP is used, this command is applicable via VIP only.</li><li>• The network mask is configured via the command “interface proxy-arp &lt;pra-id&gt; ip mask-len &lt;value&gt;”</li><li>• The IP address configured must be that of the management interface of the system.</li></ul> |                                 |

## ha member priority

**ha member <hostname> priority <value>**

**no ha member <hostname> priority**

Sets the master election priority for member when servicing the Proxy-ARP interface. The no form of the command resets the parameter to its default value.

|                           |                                                                                                                                                                                                                                                                                                               |                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Syntax Description</b> | hostname                                                                                                                                                                                                                                                                                                      | The member's hostname               |
|                           | value                                                                                                                                                                                                                                                                                                         | The priority value. Range is 1-255. |
| <b>Default</b>            | 100                                                                                                                                                                                                                                                                                                           |                                     |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                    |                                     |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                      |                                     |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                         |                                     |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha member my-member-hostname priority 100 switch (config interface proxy-arp 1) #</pre>                                                                                                                                                                          |                                     |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                               |                                     |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If Proxy-ARP VIP is used, this command is applicable via VIP only.</li> <li>• Priority is calculated based on the configured priority and the GUID. The active member with the highest priority becomes master the next time master election takes place.</li> </ul> |                                     |

## ha member clear counters

**ha member <hostname> clear counters**

Clears a specific member's interface counters.

|                           |                                                                                                                                        |                       |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Syntax Description</b> | hostname                                                                                                                               | The member's hostname |
| <b>Default</b>            | N/A                                                                                                                                    |                       |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                             |                       |
| <b>History</b>            | 3.3.4402                                                                                                                               |                       |
| <b>Role</b>               | admin                                                                                                                                  |                       |
| <b>Example</b>            | <pre>switch (config interface proxy-arp 1) # ha member my-member-hostname clear counters switch (config interface proxy-arp 1) #</pre> |                       |
| <b>Related Commands</b>   |                                                                                                                                        |                       |
| <b>Note</b>               | If Proxy-ARP VIP is used, this command is applicable via VIP only.                                                                     |                       |

## ip multicast

**ip multicast <ipv4-address>**  
**no ip multicast [<ipv4-address>]**

Adds a multicast group to a Proxy-ARP instance.  
 The no form of the command deletes a specified multicast group from a Proxy-ARP instance or all multicast groups that Proxy-ARP instance belongs to.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | ipv4-address                                                                                                                                                                                                                                                                                                                                                                                                                                    | Specifies a multicast group.<br>Must be a valid IPv4 address in the MC range (224.0.0.0 – 239.255.255.255 – however, the address 239.0.0.77 cannot be given, since this address is reserved for GLBP). |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                        |
| <b>Configuration Mode</b> | Config Interface Proxy-ARP                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                        |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                        |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                        |
| <b>Example</b>            | switch (config interface proxy-arp 1) # ip multicast [<ipv4-address>]                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                        |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                        |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>The command is available when the platform is single-box only, and only in Proxy-ARP MC mode.</li> <li>The groups 224.0.0.1 (all-nodes group) and 224.0.0.2 (all-routers group) can be configured but will actually have any effect on the configuration of these routes in the hardware. These two groups are configured automatically by the application, regardless of user configuration.</li> </ul> |                                                                                                                                                                                                        |

## 8.5.3 Show

### show ip proxy-arp

#### show ip proxy-arp

Displays the admin state of the Proxy-ARP feature.

|                           |                                                                                |
|---------------------------|--------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                            |
| <b>Default</b>            | N/A                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                               |
| <b>History</b>            | 3.3.0000                                                                       |
|                           | 3.3.4402 Added note.                                                           |
| <b>Role</b>               | admin; monitor                                                                 |
| <b>Example</b>            | switch (config) # show ip proxy-arp<br>Proxy-arp: enabled<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                |
| <b>Note</b>               | This command is applicable from the Box IP only.                               |

## show ip route

**show ip route [interface proxy-arp <pra-id>]**

Displays routing table.

|                           |                                                                                                                                                                                                                                                                                                                      |                                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Syntax Description</b> | interface proxy-arp <pra-id>                                                                                                                                                                                                                                                                                         | Displays IP route table for a specific Proxy-ARP interface |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                  |                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                     |                                                            |
| <b>History</b>            | 3.3.4000                                                                                                                                                                                                                                                                                                             |                                                            |
|                           | 3.3.4402                                                                                                                                                                                                                                                                                                             | Added note.                                                |
| <b>Role</b>               | admin; monitor                                                                                                                                                                                                                                                                                                       |                                                            |
| <b>Example</b>            | <pre>switch (config) # show ip route interface proxy-arp 1 Destination      Mask           Gateway        Interface  Source  Distance/Metric 22.22.0.0        255.255.0.0    0.0.0.0        proxy-arp 1 kernel    0/0 default          0.0.0.0        22.22.0.174    proxy-arp 1 static  0/0 switch (config) #</pre> |                                                            |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                      |                                                            |
| <b>Note</b>               | This command is applicable from the Box IP only.                                                                                                                                                                                                                                                                     |                                                            |



## show ip arp

**show ip arp [interface proxy-arp [<instance>] ha designated-member]**

Displays ARP table.

| Syntax Description | interface proxy-arp<br>[<instance>]                                                                                                                                                                                                                                                                                                                                                                                                             | Filters the table according to a specific interface (i.e. proxy-arp, mgmt0) |             |      |                  |           |               |             |                   |             |               |            |                        |             |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------|------|------------------|-----------|---------------|-------------|-------------------|-------------|---------------|------------|------------------------|-------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |             |      |                  |           |               |             |                   |             |               |            |                        |             |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |             |      |                  |           |               |             |                   |             |               |            |                        |             |
| History            | 3.3.3000                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                             |             |      |                  |           |               |             |                   |             |               |            |                        |             |
|                    | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                        | Added note.                                                                 |             |      |                  |           |               |             |                   |             |               |            |                        |             |
| Role               | admin; monitor                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                             |             |      |                  |           |               |             |                   |             |               |            |                        |             |
| Example            | switch (config) # show ip arp interface proxy arp 1<br><br>Total number of entries: 2<br><table><thead><tr><th>Address</th><th>Type</th><th>Hardware Address</th><th>Interface</th></tr></thead><tbody><tr><td>192.168.12.25</td><td>Dynamic ETH</td><td>00:02:C9:45:45:51</td><td>proxy-arp 1</td></tr><tr><td>192.168.12.15</td><td>Infiniband</td><td>00:02:C9:02:00:24:CB:4</td><td>proxy-arp 1</td></tr></tbody></table> switch (config) # |                                                                             | Address     | Type | Hardware Address | Interface | 192.168.12.25 | Dynamic ETH | 00:02:C9:45:45:51 | proxy-arp 1 | 192.168.12.15 | Infiniband | 00:02:C9:02:00:24:CB:4 | proxy-arp 1 |
| Address            | Type                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hardware Address                                                            | Interface   |      |                  |           |               |             |                   |             |               |            |                        |             |
| 192.168.12.25      | Dynamic ETH                                                                                                                                                                                                                                                                                                                                                                                                                                     | 00:02:C9:45:45:51                                                           | proxy-arp 1 |      |                  |           |               |             |                   |             |               |            |                        |             |
| 192.168.12.15      | Infiniband                                                                                                                                                                                                                                                                                                                                                                                                                                      | 00:02:C9:02:00:24:CB:4                                                      | proxy-arp 1 |      |                  |           |               |             |                   |             |               |            |                        |             |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                             |             |      |                  |           |               |             |                   |             |               |            |                        |             |
| Note               | <ul style="list-style-type: none"><li>This command is applicable from the Box IP only.</li><li>If Proxy-ARP HA is enabled, the parameter “ha designated-member” makes the ARP table include only the entries designated by this specific node.</li></ul>                                                                                                                                                                                        |                                                                             |             |      |                  |           |               |             |                   |             |               |            |                        |             |

## show interfaces proxy-arp

**show interfaces proxy-arp <id> [configured]**

Displays interface configuration and status.

|                           |                                                                                                                                                                                                                                                              |                                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | id                                                                                                                                                                                                                                                           | A Proxy-ARP interface number                                                               |
|                           | configured                                                                                                                                                                                                                                                   | Displays information only about a Proxy-ARP interface that has been configured by the user |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                          |                                                                                            |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                             |                                                                                            |
| <b>History</b>            | 3.3.0000                                                                                                                                                                                                                                                     |                                                                                            |
|                           | 3.3.4402                                                                                                                                                                                                                                                     | Added note.                                                                                |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                        |                                                                                            |
| <b>Example</b>            | <pre>switch (config) # show interfaces proxy-arp 1 configured Proxy-arp 1   Admin state: Enabled   Internet Address: 108.10.24.110/16   Description: N/A   MTU: 1500   Counters: Enabled   Member interfaces: vlan 3374, pkey 0x7fff switch (config) #</pre> |                                                                                            |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                              |                                                                                            |
| <b>Note</b>               | This command is applicable from the Box IP only.                                                                                                                                                                                                             |                                                                                            |

## show interfaces proxy-arp brief

### show interfaces proxy-arp brief

Displays the status of interfaces.

|                           |                                                                                                                                                                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                     |
| <b>History</b>            | 3.3.4000                                                                                                                                                                                                                                             |
|                           | 3.3.4402 Added note.                                                                                                                                                                                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config)# show interfaces proxy-arp brief Interface      Description  State  Bridged interfaces ----- proxy-arp 1    descr1      Up      vlan 23, pkey 0x23 proxy-arp 2    descr2      Down    vlan 24, pkey 0x24 switch (config)#</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                      |
| <b>Note</b>               | This command is applicable from the management box IP only.                                                                                                                                                                                          |

## show sma port

**show sma port** <number>

Displays vTCA port configuration.

|                           |                                                                   |
|---------------------------|-------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                               |
| <b>Default</b>            | N/A                                                               |
| <b>Configuration Mode</b> | Any Command Mode                                                  |
| <b>History</b>            | 3.3.0000                                                          |
|                           | 3.3.4402                      Added note.                         |
| <b>Role</b>               | admin                                                             |
| <b>Example</b>            | switch (config) # show sma port 1<br>Enabled<br>switch (config) # |
| <b>Related Commands</b>   |                                                                   |
| <b>Note</b>               | This command is applicable from the Box IP only.                  |

## show proxy-arp ha

### show proxy-arp ha

Displays the configuration and status of all nodes in the HA Proxy-ARP group.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show proxy-arp ha Load balancing: ib-base-ip Number of Proxy-Arp interfaces: 32 Proxy Arp VIP: ===== Proxy-arp group name: my-pra-group HA VIP address: 192.168.11.55/24 Active nodes: 4 Hostname      State      IP Address ----- gateway1      master     10.10.10.11 gateway2      standby    10.10.10.12 gateway3      standby    10.10.10.13 gateway4      standby    10.10.10.14 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note</b>               | <ul style="list-style-type: none"> <li>• If Proxy ARP VIP is used, this command is applicable via the VIP only.</li> <li>• Up to 16 active nodes from the same CPU type are supported.</li> <li>• The IP addresses displayed is the management IP of the gateways.</li> </ul>                                                                                                                                                         |

## show interfaces proxy-arp ha

**show interfaces proxy-arp <pra-id> ha**

Displays the Proxy-ARP interface configuration and a summary of per-member configuration and status.

| Syntax Description | pra-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Interface number |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |
| History            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |
| Example            | <pre>switch (config) # show interfaces proxy-arp 1 ha  Proxy-arp 1   Keep Alive loss threshold: 10   Keep Alive loss interval: 120 seconds   Load balancing algorithm: ib-base-ip   IP masklen: 24   Admin state: Enabled   MTU: 1500   Counters: Disabled   Bridged interfaces: vlan 10, pkey 0x7fff   Number of members: 3   Hostname  Description  Admin State  LB State  Operational State  IP          Priority   -----   hostname1  host1-dscr  Enabled     Active    Up                 192.168.12.30  100   hostname2  host2-dscr  Enabled     Standby   Up                 192.168.12.33  100   hostname3  host3-dscr  Enabled     Down      Down               192.168.12.31  100  switch (config) #</pre> |                  |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
| Note               | This command is applicable via the VIP only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |

## show interfaces proxy-arp ha ip arp

**show interfaces proxy-arp <pra-id> ha ip arp [designated]**

Displays the current ARP table of all members of this Proxy-ARP instance.

| Syntax Description | pra-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Proxy-ARP ID                                                                         |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------|------|------------------|---------|-------------|-------------|-------------------|--------------|-------------|------------|-------------------------|-------------------------------|-------------|------------|-------------------------|--------------|-------------|------------|-------------------------|--------------|-------------|------------|-------------------------|--------------|-------------|------------|-------------------------|--------------|-------------|------------|-------------------------|--------------|-------------|------------|-------------------------|--------------|--------------|------------|-------------------------|--------------|
|                    | designated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Displays the current designated ARP table for all members of this Proxy-ARP instance |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                      |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| History            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                      |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| Example            | <pre>switch (config) # show interfaces proxy-arp 1 ha ip arp</pre> <p>Proxy-arp 1 HA arp table:</p> <p>Total number of entries: 9</p> <table><thead><tr><th>Address</th><th>Type</th><th>Hardware Address</th><th>Members</th></tr></thead><tbody><tr><td>192.167.5.2</td><td>Dynamic ETH</td><td>00:02:C9:43:1C:D1</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.3</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125,<br/>r-mgtswd-126</td></tr><tr><td>192.167.5.4</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.5</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.6</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.7</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.8</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.9</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr><tr><td>192.167.5.10</td><td>Dynamic IB</td><td>00:14:05:00:00:00:00:80</td><td>r-mgtswd-125</td></tr></tbody></table> <pre>switch (config) #</pre> |                                                                                      | Address                       | Type | Hardware Address | Members | 192.167.5.2 | Dynamic ETH | 00:02:C9:43:1C:D1 | r-mgtswd-125 | 192.167.5.3 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125,<br>r-mgtswd-126 | 192.167.5.4 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 | 192.167.5.5 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 | 192.167.5.6 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 | 192.167.5.7 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 | 192.167.5.8 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 | 192.167.5.9 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 | 192.167.5.10 | Dynamic IB | 00:14:05:00:00:00:00:80 | r-mgtswd-125 |
| Address            | Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hardware Address                                                                     | Members                       |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.2        | Dynamic ETH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 00:02:C9:43:1C:D1                                                                    | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.3        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125,<br>r-mgtswd-126 |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.4        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.5        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.6        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.7        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.8        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.9        | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| 192.167.5.10       | Dynamic IB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 00:14:05:00:00:00:00:80                                                              | r-mgtswd-125                  |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                      |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |
| Note               | <ul style="list-style-type: none"><li>If Proxy ARP VIP is used, this command is applicable via the VIP only.</li><li>Aged-out ARP entries may also appear.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                      |                               |      |                  |         |             |             |                   |              |             |            |                         |                               |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |             |            |                         |              |              |            |                         |              |

## show interfaces proxy-arp ha designated-member

**show interfaces proxy-arp <pra-id> ha designated-member <Ethernet-IP> <InfiniBand-IP>**

Calculates which member of this Proxy-ARP instance handles the traffic between the given Ethernet IP and the given InfiniBand IP.

|                           |                                                                                                                                                                                        |                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Syntax Description</b> | pra-id                                                                                                                                                                                 | Proxy-ARP ID.                                |
|                           | IP-Address                                                                                                                                                                             | Host IP connected to the Ethernet network.   |
|                           | InfiniBand-IP                                                                                                                                                                          | Host IP connected to the InfiniBand network. |
| <b>Default</b>            | N/A                                                                                                                                                                                    |                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                       |                                              |
| <b>History</b>            | 3.3.4402                                                                                                                                                                               |                                              |
| <b>Role</b>               | admin                                                                                                                                                                                  |                                              |
| <b>Example</b>            | <pre>switch (config) # show interfaces proxy-arp 1 ha designated-member 10.10.10.10 10.10.10.11 Member: &lt;calculated hostname that will pass the traffic&gt; switch (config) #</pre> |                                              |
| <b>Related Commands</b>   |                                                                                                                                                                                        |                                              |
| <b>Note</b>               | This command is applicable via the VIP only.                                                                                                                                           |                                              |



## show interfaces proxy-arp ha host-list

**show interfaces proxy-arp <pra-id> ha host-list designated-member**

Displays designated member for passing Ethernet-IB traffic

|                           |                                                                                                                                                                                                                                                                                                                                                                                     |               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Syntax Description</b> | pra-id                                                                                                                                                                                                                                                                                                                                                                              | Proxy-ARP ID. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                 |               |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                    |               |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                            |               |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                               |               |
| <b>Example</b>            | <pre>switch (config) # show interfaces proxy-arp 7 ha host-list designated-member Proxy-arp 7 HA host list:  Total number of entries: 2    Address          Type          Hardware Address    Members   -----   7.120.10.55      Dynamic ETH   00:02:C9:45:5B:40    Piranha-GW-242   7.120.10.54      Dynamic IB    00:02:C9:03:00:E6:E5:41 Piranha-GW-242  switch (config) #</pre> |               |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                     |               |
| <b>Note</b>               | This command is applicable via the VIP only.                                                                                                                                                                                                                                                                                                                                        |               |

## show interfaces proxy-arp ha detail

### show interfaces proxy-arp <pra-id> ha detail

Displays the Proxy ARP interface detail configuration and provides a summary of per-member configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Syntax Description</b> | pra-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Proxy-ARP ID.                                |
|                           | Ethernet-IP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Host IP connected to the Ethernet network.   |
|                           | InfiniBand-IP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Host IP connected to the InfiniBand network. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                              |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                              |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |
| <b>Example</b>            | <pre>switch (config) # show interfaces proxy-arp 1 ha detail  Proxy-arp 1   Table update interval: 120 seconds   PRA table fast learn time: 1 second   Master election learning interval: 30 seconds   Advertisement interval: 1 second   PRA table learn time: 30 seconds   Keep Alive loss threshold: 10   Keep Alive loss interval: 120 seconds   Host list differential update interval: 3 seconds   Host list update interval: 300 seconds   Load balancing algorithm: ib-base-ip   IP masklen: 24   Admin state: Enabled   MTU: 1500   Counters: Disabled   Bridged interfaces: vlan 2, pkey 0x3    Hostname  Description  Admin State  LB State  Operational  State IP      Priority   -----   hostname1* host1-dscr  Enabled     Active    Up           192.168.12.30 100   hostname2  host2-dscr  Enabled     Standby   Up           192.168.12.33 100   hostname3  host3-dscr  Enabled     Down      Down         192.168.12.31 100  switch (config) #</pre> |                                              |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |
| <b>Note</b>               | This command is applicable via the VIP only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |

## show interfaces proxy-arp ha member

**show interfaces proxy-arp <pra-id> ha member <hostname>**

Displays member interface configuration and status.

|                           |                                                                                                                                                                                                                                                                                                                                             |                    |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Syntax Description</b> | pra-id                                                                                                                                                                                                                                                                                                                                      | Interface number.  |
|                           | hostname                                                                                                                                                                                                                                                                                                                                    | Member's hostname. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                                                                                         |                    |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                                                                                            |                    |
| <b>History</b>            | 3.3.4402                                                                                                                                                                                                                                                                                                                                    |                    |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                                                                                       |                    |
| <b>Example</b>            | <pre>switch (config) # show interfaces proxy-arp 1 ha member my-member Proxy-arp 1 Admin state: Enabled Operational state: Up GUID: 00:02:C9:03:00:66:08:63 Internet Address: 10.10.10.10/24 Broadcast Address: 10.10.10.255 Description: N/A MTU: 1500 Counters: Disabled Bridged interfaces: vlan 10, pkey 0x7fff switch (config) #</pre> |                    |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                                                                                             |                    |
| <b>Note</b>               | This command is applicable via the VIP only.                                                                                                                                                                                                                                                                                                |                    |

## show proxy-arp mode

### show proxy-arp mode

Displays the Proxy-ARP mode.

|                           |                                                                                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                                                                                                  |
| <b>Default</b>            | N/A                                                                                                                                                                                                                  |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                     |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                             |
| <b>Role</b>               | admin                                                                                                                                                                                                                |
| <b>Example</b>            | <pre>switch (config) # show proxy-arp mode Proxy-arp mode: multicast Resource          Total ----- ETH hosts         128 IB hosts          1024 Unicast routes    160 Multicast routes  2500 switch (config) #</pre> |
| <b>Related Commands</b>   |                                                                                                                                                                                                                      |
| <b>Note</b>               | This command is applicable via the VIP only.                                                                                                                                                                         |

## show ip multicast interface proxy-arp

**show ip multicast interface proxy-arp [<if-number> | <if-number> debug]**

Displays multicast table for all Proxy-ARP interfaces.

|                           |                                                                                                                                                                                                                                                                          |                                                                                 |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Syntax Description</b> | if-number                                                                                                                                                                                                                                                                | Specifies interface number.                                                     |
|                           | debug                                                                                                                                                                                                                                                                    | Displays Proxy-ARP instance multicast information, including debug information. |
| <b>Default</b>            | N/A                                                                                                                                                                                                                                                                      |                                                                                 |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                                                                                                                                                         |                                                                                 |
| <b>History</b>            | 3.4.0000                                                                                                                                                                                                                                                                 |                                                                                 |
|                           | 3.4.1100                                                                                                                                                                                                                                                                 | Updated Example                                                                 |
| <b>Role</b>               | admin                                                                                                                                                                                                                                                                    |                                                                                 |
| <b>Example</b>            | <pre>switch (config) # show ip multicast interface proxy-arp Proxy-arp multicast list:  Total number of entries: 2  Address          Interface      Source ----- 239.0.0.77       proxy-arp 2    Dynamic 255.255.255.255  proxy-arp 2    Dynamic switch (config) #</pre> |                                                                                 |
| <b>Related Commands</b>   |                                                                                                                                                                                                                                                                          |                                                                                 |
| <b>Note</b>               | This command is applicable from the box IP only.                                                                                                                                                                                                                         |                                                                                 |

## show ip multicast interface proxy-arp count

### show ip multicast interface proxy-arp count

Displays number of multicast groups for all Proxy-ARP interfaces.

|                           |                                                                                                                                              |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax Description</b> | N/A                                                                                                                                          |
| <b>Default</b>            | N/A                                                                                                                                          |
| <b>Configuration Mode</b> | Any Command Mode                                                                                                                             |
| <b>History</b>            | 3.4.1100                                                                                                                                     |
| <b>Role</b>               | admin                                                                                                                                        |
| <b>Example</b>            | switch (config) # show ip multicast interface proxy-arp count<br>Proxy-arp multicast count: 20 (static: 12, dynamic: 8)<br>switch (config) # |
| <b>Related Commands</b>   |                                                                                                                                              |
| <b>Note</b>               | This command is applicable from the box IP only.                                                                                             |

## show interfaces proxy-arp ha multicast-list

**show interfaces proxy-arp <pra-id> ha multicast-list**

Displays multicast table per Proxy-ARP interface, for all cluster members.

| Syntax Description | pra-id                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Proxy-ARP number. |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Default            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |
| Configuration Mode | Any Command Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |
| History            | 3.4.1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |
| Role               | admin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |
| Example            | <pre>switch (config) # show interfaces proxy-arp 70 ha multicast-list Proxy-arp 70 HA multicast list:  Total number of entries: 10  Address                Source                Members ----- 224.0.0.1              Dynamic              x86-GW-181 224.0.0.2              Dynamic              x86-GW-181 228.0.0.0              Static               x86-GW-181 228.0.0.1              Static               x86-GW-181 228.0.0.2              Static               x86-GW-181 228.0.0.3              Static               x86-GW-181 228.0.0.4              Static               x86-GW-181 228.0.0.5              Static               x86-GW-181 239.0.0.77             Dynamic              x86-GW-181 255.255.255.255        Dynamic              x86-GW-181 switch (config) #</pre> |                   |
| Related Commands   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |
| Note               | This command is applicable from the VIP only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |

## Appendix A: MEX6200 System

### A.1 MEX6200 Overview

The MEX6200 is a 3R WDM transponder, available as part of the MetroX® MTX62x0 family. It can multiplex several client signals (services) on a single fiber, each with a different wavelength, and transport them over a long distance. It is typically deployed as customer premises equipment (CPE) in enterprise campus environments and in central offices.

MEX6200 is available with 16 link ports forming up to 8 high-speed transponders that can serve lower-rate client signals of 10Gb/s.

MEX6200 is a highly integrated device that can incorporate MUX/DEMUX, Erbium Doped Fiber Amplifier (EDFA), and Dispersion Compensation Module (DCM) modules, to ensure data transmission to distances of up to 80km.

MEX6200 provides uplink 1+1 facility protection for the line ports. It also supports an optional Optical Switch that provides 1+1 facility protection for point-to-point topology.

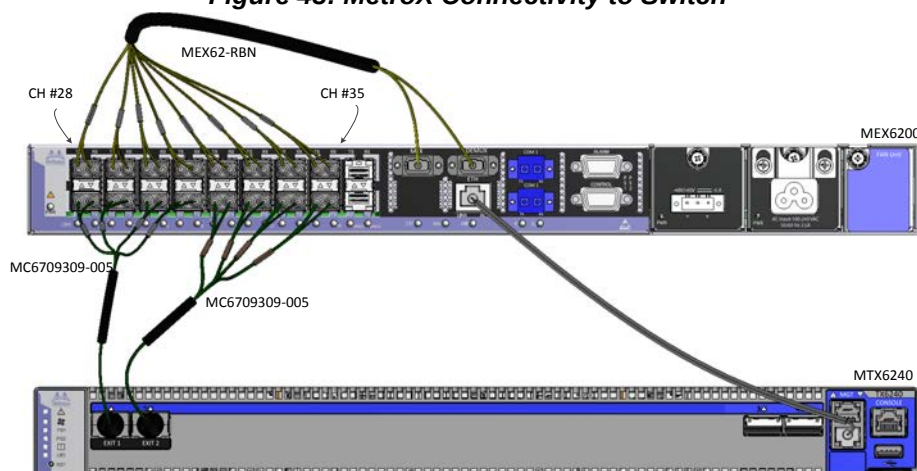
### A.2 Getting Started

This section describes the prerequisites and the procedure required to get the MetroX system.



Be sure to follow the installation instructions in the Quick Start Guide packaged within the MetroX bundle's box.

**Figure 43: MetroX Connectivity to Switch**



Be sure not to close TCP ports 81 and 82 in your network. Those ports are used for HTTP and HTTPs connection.



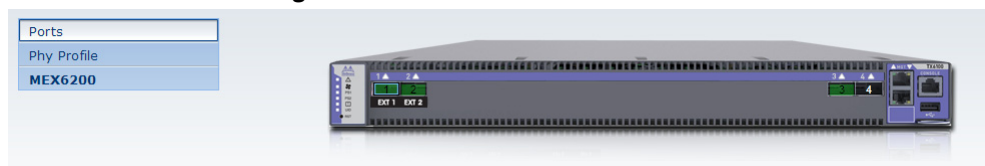
➤ **To access the MEX6200 webpage:**

**Step 1.** Navigate to the MetroX's WebUI.

**Step 2.** Go to Ports tab.

**Step 3.** Click the MEX6200 sidebar tab to reach the MEX6200 WebUI page.

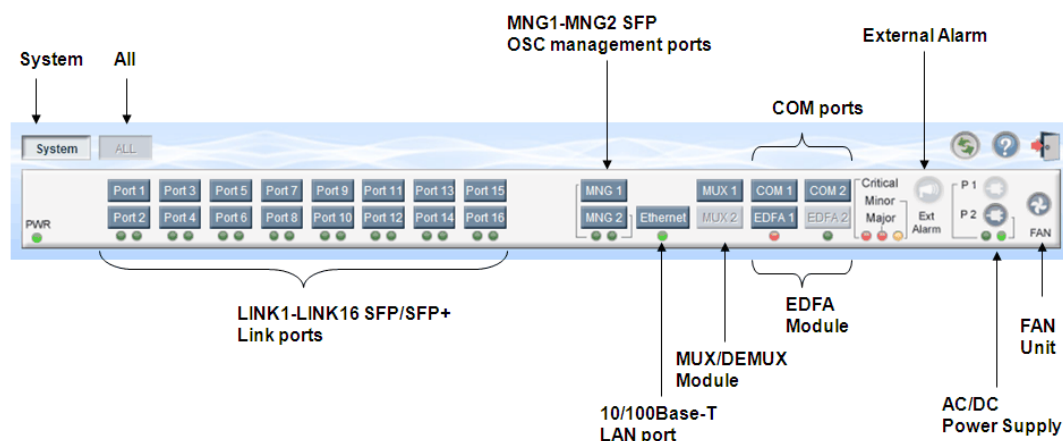
**Figure 44: MetroX Ports Tab Sidebar**



**Step 4.** Enable the needed link ports via the WebUI by going to each port's configuration tab and clicking on the "Admin Up" button.

The following figure shows an example of the buttons used for performing operations in the Web application.

**Figure 45: MEX6200 Item Buttons**



The buttons displayed vary according to the configuration. For example, if MEX6200 does not have an EDFA module installed, the EDFA button is disabled.

The Item buttons displayed also vary according to the context of the window. For example, the FAN button is disabled in the Fault window because no faults are defined for this unit.

On the left side of the WebUI you can find the sidebar buttons.

**Figure 46: Sidebar Buttons**



## A.3 Fault Management

This chapter describes the fault management of MEX6200, which is used to localize and identify problems in the network incorporating WDM extension units.

### A.3.1 Alarms

MEX6200 keeps a list of the alarms currently detected on the system. When an alarm is detected, an “Alarm Rise” event is generated and the alarm is added to the list. When an “Alarm Clear” is detected, the alarm is removed from the list.

The following information is stored for each alarm:

- Date and Time – the date and time when the alarm was detected.
- Source – entity that caused the alarm.
- Severity – severity of the alarm.
- Type – type of the alarm.
- Service Affecting – Yes or No according to the alarm impact.

### A.3.2 Events

MEX6200 continuously monitors the traffic signals and other exceptional conditions. Whenever such conditions occur, MEX6200 generates a time stamped event message and sends it as an SNMP notification to the registered management systems. MEX6200 logs the history of the last 512 events in a cyclic buffer that can be browsed by the Web application or by SNMP management systems.

In addition, the events and audit messages are printed in the system log files of MEX6200, which can be exported to a text file for offline viewing.

MEX6200 provides the following events:

- Alarm Rise: Alarms are standing faults. They are raised after a configurable stabilization period of several seconds. These events are generated when a new alarm occurs.
- Alarm Clear: Alarms are standing faults. They are cleared after a configurable stabilization period of several seconds. These events are generated when an alarm is cleared.
- Link Up: These are standard SNMP events that are generated when the operational status of a port is changed from Down to Up.
- Link Down: These are standard SNMP events that are generated when the operational status of a port is changed from Up to Down.
- Cold Restart: These are standard SNMP events that are generated after a Cold Restart to the node.
- Warm Restart: These are standard SNMP events that are generated after a Warm Restart to the node.
- Test Status Changed: These events are generated when the loopback or PRBS test status of a port is changed.
- Protection Switching Event: These events are generated when protection switching occurs.
- Inventory Change: These events are generated when the node inventory is changed.
- Unsolicited Event: These events are generated when an exceptional event occurs.

- **Configuration Change:** These events are generated when the node configuration is changed.

The MEX6200 generates an event when the configuration of a node is explicitly changed by the user and stores the event in the Configuration Changes log for auditing.

### A.3.3 Alarm and Event Messages

This appendix describes the possible alarm and event messages.

The following table lists the MEX6200's alarm messages and explains their interpretation and/or corrective measures.

**Table 57 - Alarm Messages**

| Source               | Message                             | Interpretation/Corrective Measures                                                                                                                                                                                              |
|----------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PSU1/PSU2            | Power Supply Failure                | Replace the faulty PSU.                                                                                                                                                                                                         |
| PSU1/PSU2            | Power Failure – Low Voltage         | Replace the faulty PSU.                                                                                                                                                                                                         |
| FAN                  | Fan Failure                         | The internal cooling fan of the device does not operate. Replace the FAN unit as soon as possible.                                                                                                                              |
| System               | Hardware Failure                    | A technical failure has been detected. Replace the device.                                                                                                                                                                      |
| System               | Database Restore Failed             | Failed to update the system configuration.                                                                                                                                                                                      |
| System               | Database Restore in Progress        | Failed to update the system configuration.                                                                                                                                                                                      |
| System               | Cold Restart Required: FPGA Changed | After a warm restart, the FPGA version is not consistent with the software version. A cold restart is required.                                                                                                                 |
| System               | Software Upgrade Failed             | The downloaded software is corrupted. Reload the software.                                                                                                                                                                      |
| System               | Network Time Protocol Failure       | SNTP timing protocol failure. Check the IP connection to the NTP servers.                                                                                                                                                       |
| External Input Alarm | (As configured)                     | The External Input Alarm is active.                                                                                                                                                                                             |
| GbE (Copper)         | Ethernet Link Failure               | Check the Auto Negotiation parameters.                                                                                                                                                                                          |
| Ethernet             | Loss of Synchronization             | Loss of Synchronization has been detected on the data links. Check that the input signal rate is correct.                                                                                                                       |
| Optics               | Optics Removed                      | The optical module has been removed. Insert an optical module or shut the port down.                                                                                                                                            |
| Optics               | Optics Loss of Light                | A Loss of Light indication has been received in regards to the specific optical module. The optical power of the received signal is below the minimum power level. Check the fiber connection and/or clean the fiber connector. |
| Optics               | Optics Transmission Fault           | The transceiver is not transmitting. Replace the optical module.                                                                                                                                                                |

**Table 57 - Alarm Messages**

| Source | Message                                      | Interpretation/Corrective Measures                                                                                                                  |
|--------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Optics | Optics Hardware Failure                      | A hardware fault was detected in the optical module. Replace the optical module.                                                                    |
| Optics | Optics TX Loss of Lock                       | TX CDR Loss of lock.                                                                                                                                |
| Optics | Optics High Transmission Power               | The transmission power of the optical module is above its specification.                                                                            |
| Optics | Optics Low Transmission Power                | The transmission power of the optical module is below its specification.                                                                            |
| Optics | Optics High Temperature                      | The temperature inside the optical module is above its specification.                                                                               |
| Optics | Optics Low Temperature                       | The temperature inside the optical module is below its specification.                                                                               |
| Optics | Optics High Reception Power                  | The incoming signal into the optical module is too high. An attenuation of the input signal is required.                                            |
| Optics | Optics Low Reception Power                   | The incoming signal into the optical module is too low.                                                                                             |
| Optics | Optics High Temperature                      | The temperature inside the optical module is above its specification.                                                                               |
| Optics | Optics Low Temperature                       | The temperature inside the optical module is below its specification.                                                                               |
| Optics | Optics High Laser Wavelength                 | The laser wavelength exceeds the high alarm level.                                                                                                  |
| Optics | Optics Low Laser Wavelength                  | The laser wavelength exceeds the low alarm level.                                                                                                   |
| Optics | Optics Loss Propagation                      | The laser was shut down due to a problem on the interface of the port mate.                                                                         |
| Optics | Optics Bit Rate Mismatch                     | The inserted optical module has a mismatch problem due to the wrong rate or type. Replace the optical module or update the configured service type. |
| Optics | Unauthorized Optics Inserted and is Shutdown | The inserted optical module is unauthorized for use. Replace the optical module with an authorized optical module.                                  |
| EDFA   | EDFA Gain                                    | The EDFA gain is out of acceptable range.                                                                                                           |
| EDFA   | EDFA Hardware failure                        | The interface does not respond.                                                                                                                     |
| EDFA   | EDFA Temperature                             | The EDFA temperature is out of acceptable range.                                                                                                    |
| EDFA   | EDFA Loss of Light                           | No signal is detected.                                                                                                                              |
| EDFA   | EDFA Receive Power Out of Bound              | The receive signal is out of acceptable range. Check the optical power of the EDFA client signals. Use attenuation if required.                     |

**Table 57 - Alarm Messages**

| Source | Message                          | Interpretation/Corrective Measures                                                                  |
|--------|----------------------------------|-----------------------------------------------------------------------------------------------------|
| EDFA   | EDFA Transmit Power Out of Bound | The transmit signal is out of acceptable range. Check the optical power of the EDFA client signals. |
| EDFA   | EDFA Down                        | Closed the EDFA output upon loss of input. Check the EDFA client signals.                           |
| EDFA   | EDFA Eye Safety                  | Hazard. No fiber is connected to the port.                                                          |

The following table lists the configuration event messages generated by the MEX6200 and explains their interpretation.

**Table 58 - Configuration Event Messages**

| Source       | Message                    | Interpretation                                                    |
|--------------|----------------------------|-------------------------------------------------------------------|
| System       | Change date                | The system date or time has changed.                              |
| System       | Restore provisioning       | A new configuration file has been loaded.                         |
| System       | Change IP                  | The IP of the node has changed.                                   |
| System       | Configuration change       | The system configuration was changed.                             |
| System       | Alarm cut-off              | The Alarm Cut-off has been operated.                              |
| System       | Add user                   | A new user was added.                                             |
| System       | Delete user                | A user was deleted.                                               |
| System       | Delete routing entry       | A routing entry was deleted from the system Static Routing table. |
| System       | Software Upgrade           | Software Upgrade has been performed.                              |
| Port         | Admin Down                 | Admin Down has been performed for the port.                       |
| Port         | Admin Up                   | Admin Up has been performed for the port.                         |
| Link Port    | Provisioning change        | The provisioning of the port has changed.                         |
| Link Port    | Test Operated              | A test has been operated.                                         |
| Link Port    | Facility Loopback Released | A test has been released.                                         |
| Link Port    | Reset PM counters          | Performance monitoring counters have been reset.                  |
| Service Port | Create APS                 | An APS was created for the service port.                          |
| Service Port | Remove APS                 | The APS for the service port has been removed.                    |
| Service Port | APS command                | An APS command was issued.                                        |
| Service Port | APS clear command          | An APS command was cleared.                                       |

The following table lists the other event messages generated by MEX6200 and explains their interpretation.

**Table 59 - Other Event Messages**

| Event Type         | Source           | Message                            | Interpretation                                                                   |
|--------------------|------------------|------------------------------------|----------------------------------------------------------------------------------|
| Inventory Changed  | PSU, FAN, Optics | Inventory Changed                  | The node inventory has changed. A component was inserted or removed.             |
| Switchover         | Port             | APS Switch Over                    | A protection switching event has occurred.                                       |
| Test               | Link Port        | Test Mode changed                  | The link port test mode has changed.                                             |
| ALS Status Changed | Port             | ALS Laser occurred                 | The automatic laser shutdown was activated/deactivated.                          |
| Optical Power Drop | Link port        | Power Level Drop                   | The Rx power of the port has been dropped by more than 2 dB since last interval. |
| Dying Gasp         | System           | Remote Unit Power Failure occurred | A remote unit had a power failure.                                               |
| Software Upgrade   | System           | Software Upgrade occurred          | The software upgrade operation has been completed.                               |

## A.4 Configuration Management

Table 60 provides the possible means of configuring the MEX6200.

**Table 60 - Configuration Options of the MEX6200**

| Tab                                  | Description                                                                                                                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Configuration                 | Use the System Configuration window to configure general system parameters, view system inventory, configure SNTP parameters, configure IP addresses and static routing, configure SNMP parameters and traps and configure syslog servers.   |
| Link Port Configuration              | Use the Link Port Configuration window to configure the link port, configure the SFP/SFP+ module, configure ALS for a link port, and configure the APS for a link port (not available when the optional optical switch module is installed). |
| Management Port Configuration Gray   | Use the Management Port Configuration window to configure management ports and enable/disable them, configure the SFP module, and configure ALS for a management port.                                                                       |
| Ethernet Port Configuration          | Use the Ethernet Port Configuration window to configure the Ethernet port status and parameters.                                                                                                                                             |
| MUX/DEMUX Configuration Only see MUX | Use the MUX/DEMUX Configuration window to display the wavelengths of the uplink channels of MEX6200.                                                                                                                                         |
| EDFA Configuration Gray              | Use the EDFA Configuration window to configure the EDFA module and enable/disable the module.                                                                                                                                                |

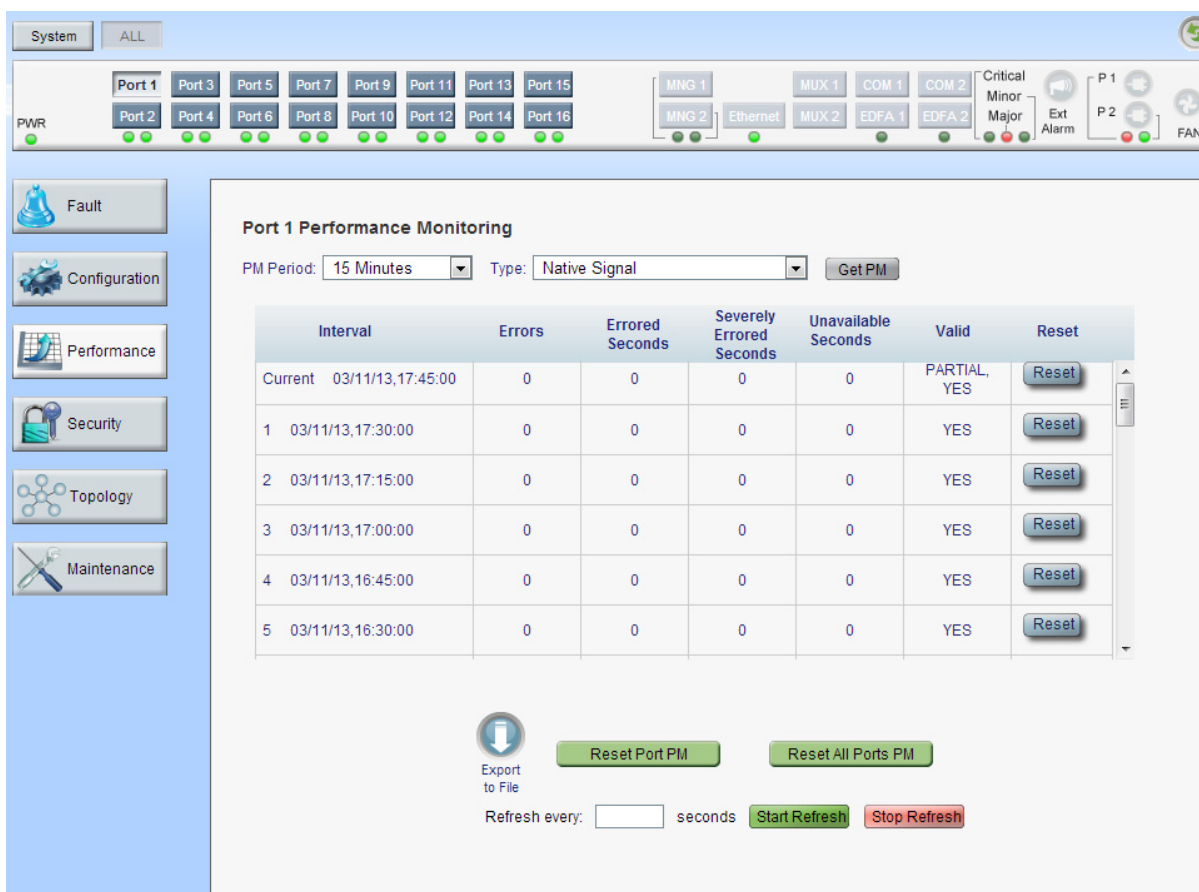
**Table 60 - Configuration Options of the MEX6200**

| Tab                            | Description                                                                                                              |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| COM Port Configuration<br>Gray | Use the COM Port Configuration window to configure a COM port and enable/disable the port, configure APS for a COM port. |
| PSU Configuration              | Use the PSU Configuration window to view information about the power supply units currently installed in the system.     |
| Fan Unit Configuration         | Use the Fan Unit Configuration window to view information about the fan unit currently installed in the system.          |

## A.5 Performance Monitoring

MEX6200 provides port performance monitoring for link ports 1-16.

Use the Link Port Performance Monitoring window to view link port performance monitoring.

**Figure 47: Link Port Performance Monitoring Window**

➤ **To open the Link Port Performance Monitoring window:**

**Step 1.** Click Performance.

**Step 2.** Click a Port button to select the port.

The appropriate Link Port Performance Monitoring window opens.

### A.5.1 Native Signal

Use the Link Port Performance Monitoring tab to view link port native signal performance monitoring.

**Figure 48: Native Signal Performance Monitoring**

**Port 1 Performance Monitoring**

PM Period:  Type:

| Interval                  | Errors | Errored Seconds | Severely Errored Seconds | Unavailable Seconds | Valid        | Reset                                |
|---------------------------|--------|-----------------|--------------------------|---------------------|--------------|--------------------------------------|
| Current 03/11/13,17:45:00 | 0      | 0               | 0                        | 0                   | PARTIAL, YES | <input type="button" value="Reset"/> |
| 1 03/11/13,17:30:00       | 0      | 0               | 0                        | 0                   | YES          | <input type="button" value="Reset"/> |
| 2 03/11/13,17:15:00       | 0      | 0               | 0                        | 0                   | YES          | <input type="button" value="Reset"/> |
| 3 03/11/13,17:00:00       | 0      | 0               | 0                        | 0                   | YES          | <input type="button" value="Reset"/> |
| 4 03/11/13,16:45:00       | 0      | 0               | 0                        | 0                   | YES          | <input type="button" value="Reset"/> |
| 5 03/11/13,16:30:00       | 0      | 0               | 0                        | 0                   | YES          | <input type="button" value="Reset"/> |

Refresh every:  seconds

➤ **To view native signal performance monitoring:**

**Step 1.** Click a Port button to select the link port.

The appropriate Link Port Performance Monitoring tab opens displaying the link port performance monitoring. The fields are explained in the following table. The counters are read only.

**Step 2.** From the PM Period drop-down list, select the interval.

**Step 3.** From the Type drop-down list, select Native Signal.

**Step 4.** Click Get PM.

The performance monitoring counters are updated.

**Step 5.** Export the PM information to a file:

1. Click Export to File.

The Opening table.csv dialog box appears.

2. Click Save File.

3. Click OK.

**Step 6.** To set the refresh rate of the PM display:

1. In the Refresh every field, type the number of seconds that the window should refresh.

The minimum refresh rate is 2 seconds.

1. Click Start Refresh.

The information is automatically updated after the specified number of seconds.



- Step 7.** Refresh the PM display manually. Click Refresh.  
The information is updated immediately.
- Step 8.** Stop the automatic refresh of the PM display. Click Stop Refresh.  
The automatic refresh is stopped and the Refresh every field is cleared.
- Step 9.** Clear the PM counters for a specific PM interval. In the table, at the end of the interval row, click Reset.
- Step 10.** Clear PM counters for a specific port. Click Reset Port PM.
- Step 11.** Clear PM counters for all ports. Click Reset All Ports PM.

**Table 61 - Link Port Performance Monitoring Tab Parameters**

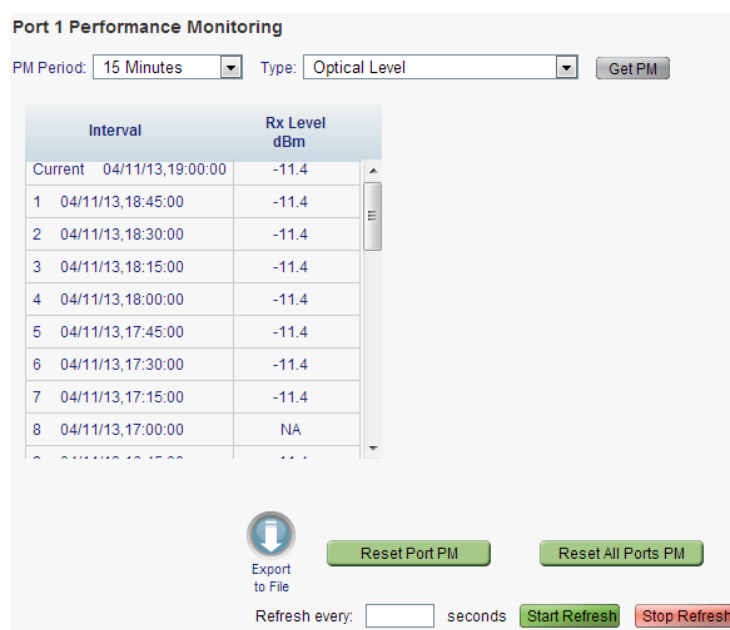
| Parameter                                               | Description                                                                       | Format/Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PM Period                                               | The interval for accumulating and displaying the performance monitoring counters. | 15 Minutes, Days                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Interval                                                | The date and time of the interval.                                                | PM Period is set to 15 Minutes: <ul style="list-style-type: none"> <li>Current: Performance monitoring counters accumulated during the current interval of 15 minutes are displayed in the first row.</li> <li>1 to 32: Performance monitoring counters accumulated during the last 32 intervals of 15 minutes are displayed in the second row to the last row of the table.</li> </ul> PM Period is set to Days: <ul style="list-style-type: none"> <li>Untimed: Performance monitoring counters accumulated since last reset of the system or since the last reset of the performance monitoring counters are displayed in the first row of the table.</li> <li>Current Day: Performance monitoring counters accumulated since 00:00 AM of the current day are displayed in the second row of the table.</li> <li>Previous Day: Performance monitoring counters accumulated during the 24 hours since 00:00 AM of the previous day are displayed in the last row of the table.</li> </ul> |
| Errors:<br>• Coding Violation (CV)<br>or<br>• B1 errors | The number of coding violation or B1 errors.                                      | The number of 64B/66B coding violation errors detected during the performance monitoring interval.<br>Note: This counter is service dependent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Errored Seconds (ES)                                    | The number of seconds in which at least one coding error was detected.            | Number of seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 61 - Link Port Performance Monitoring Tab Parameters**

| Parameter                                                                                                                                                                                                                                      | Description                                                                                                            | Format/Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Severely Errored Seconds (SES)                                                                                                                                                                                                                 | The number of seconds in which the number of errors detected crossed the threshold.                                    | Number of seconds.<br>Note: The counter stops when one of the following occurs: <ul style="list-style-type: none"> <li>The number of errors detected during the last second is below the threshold.</li> <li>The Unavailable Seconds counter is incremented.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>Unavailable Seconds (UAS)</li> </ul> or <ul style="list-style-type: none"> <li>Severely Errored Frames (SEF)</li> </ul> or <ul style="list-style-type: none"> <li>Out of Frame seconds (OOF)</li> </ul> | The number of unavailable seconds, severely errored frames, or out of frame seconds. <sup>2</sup>                      | The count of Unavailable Seconds is incremented if the number of errors crossed the Severely Errored Seconds threshold at any time during the last 10 consecutive seconds.<br>Note: This counter is service dependent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Valid                                                                                                                                                                                                                                          | Whether or not the performance monitoring interval has been completed, and whether or not the information is accurate. | <ul style="list-style-type: none"> <li>Partial: The measured interval has not been completed.</li> <li>Yes: The performance monitoring interval has been completed.</li> <li>No: The interval has been completed, but the performance monitoring information may not be accurate.</li> </ul> Note: The performance monitoring information may be inaccurate due to one of the following reasons: <ul style="list-style-type: none"> <li>The performance monitoring counters of the interval were reset.</li> <li>The node was reset during the interval.</li> <li>The port was set to Admin Down during the interval.</li> <li>The calendar time of the node was changed during the interval.</li> </ul> |

## A.5.2 Optical Level

Use the Link Port Performance Monitoring tab to view link port optical level performance monitoring.

**Figure 49: Optical Level Performance Monitoring**

➤ **To view optical level performance monitoring:**

**Step 1.** Click a Port button.

The appropriate Link Port Performance Monitoring tab opens displaying the displaying the link port performance monitoring. The fields are explained in the following table. The counters are read only.

**Step 2.** From the PM Period drop-down list, select the interval.

**Step 3.** From the Type drop-down list, select Optical Level.

**Step 4.** Click Get PM.

The optical level counters are updated.

**Step 5.** To export the optical level information to a file:

1. Click Export to File.

The Opening table.csv dialog box appears.

2.Click Save File.

3.Click OK.

**Step 6.** To set the refresh rate of the PM display:

1. In the Refresh every field, type the number of seconds that the window should refresh.

The minimum refresh rate is 2 seconds.

2.Click Start Refresh.

The information is automatically updated after the specified number of seconds.

**Step 7.** To refresh the PM display manually, click Refresh .

The information is updated immediately.

**Step 8.** To stop the automatic refresh of the PM display, click Stop Refresh.

The automatic refresh is stopped and the Refresh every field is cleared.

**Step 9.** To clear the optical level counters for a specific port, click Reset Port PM.

**Step 10.** To clear the optical level counters for all ports, click Reset All Ports PM.

**Table 62 - Link Port Performance Monitoring Tab Parameters**

| Parameter | Description                                       | Format/Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PM Period | The interval for averaging the measured Rx power. | 15 Minutes, Days                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Type      | The type of performance monitoring.               | Optical Level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Interval  | The date and time of the interval.                | PM Period is set to 15 Minutes: <ul style="list-style-type: none"> <li>• Current: The date and time of the current interval of 15 minutes is displayed in the first row.</li> <li>• 1 to 32: The date and time of the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table.</li> </ul> PM Period is set to Days: <ul style="list-style-type: none"> <li>• Untimed: The date and time of the last reset of the system or last reset of the optical level counters is displayed in the first row of the table.</li> <li>• Current Day: The date and 00:00 AM of the current day is displayed in the second row of the table.</li> <li>• Previous Day: The date and 00:00 AM of the previous day is displayed in the last row of the table.</li> </ul> |

**Table 62 - Link Port Performance Monitoring Tab Parameters**

| Parameter    | Description                                               | Format/Values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rx Level dBm | The measured Rx power level during the interval (in dBm). | PM Period is set to 15 Minutes: <ul style="list-style-type: none"> <li>• Current: The measured Rx power for the current interval of 15 minutes is displayed in the first row.</li> <li>• 1 to 32: The measured Rx power for the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table.</li> </ul> PM Period is set to Days: <ul style="list-style-type: none"> <li>• Untimed: The average of the measured Rx power since last reset of the system or since the last reset of the optical level counters is displayed in the first row of the table.</li> <li>• Current Day: The average of the measured Rx power since 00:00 AM of the current day is displayed in the second row of the table.</li> <li>• Previous Day: The average of the measured Rx power during the 24 hours since 00:00 AM of the previous day is displayed in the last row of the table.</li> </ul> |

## A.6 Maintenance

Use the maintenance tab to perform maintenance operations such as software upgrade, configuration management, restart and diagnostics.

[Table 63](#) describes the available system maintenance tasks.

**Table 63 - System Maintenance Options of the MEX6200**

| Tab               | Description                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Restart tab       | Use the Restart tab to Cold Restart (for major upgrade to the device software), Warm Restart (for minor upgrade of the device software), or restore to factory settings.                                                                                          |
| Log Files tab     | Use the Log Files tab to view and save System Log files.                                                                                                                                                                                                          |
| Configuration tab | Use the Configuration tab to update the system configuration with a previously saved file of system configuration, while preserving or replacing the IP addresses, or to upload the current system configuration of MEX6200 and save it to the local file system. |
| Software tab      | Use the Software tab to download software and to switch and activate a new software version.                                                                                                                                                                      |

Use the Link Port Maintenance window to perform diagnostic tests on link ports.

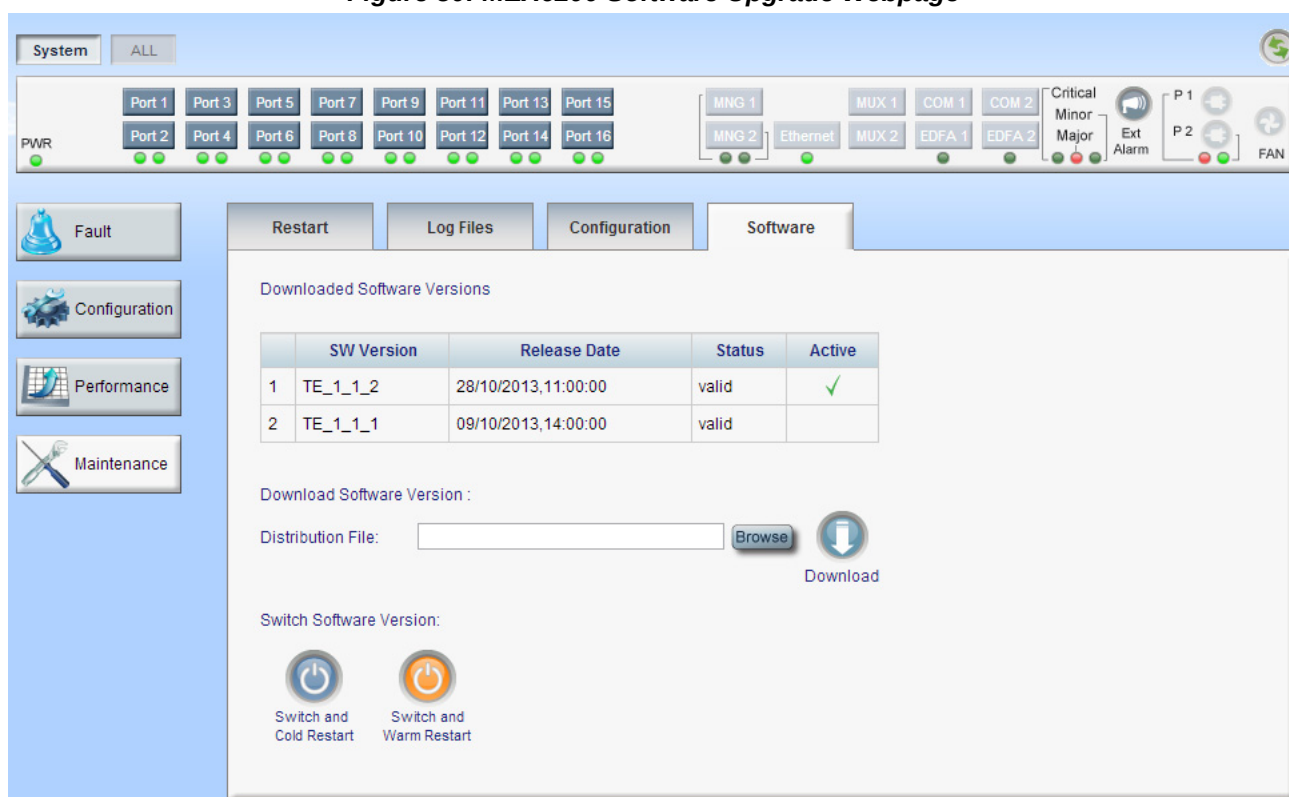
Use the External Alarm tab to configure the external alarm.

## A.6.1 Upgrading Software on the MEX6200

➤ *To perform software upgrade:*

- Step 1.** Click the “System” button at the top left of the WebUI page of MEX6200.
- Step 2.** Click the “Maintenance” sidebar button.
- Step 3.** Click the “Software” tab.
- Step 4.** Click the “Browse” button and locate the image to upgrade the software.
- Step 5.** Click “Download”.
- Step 6.** Reboot the MEX6200 by clicking “Switch and Cold Restart”.

**Figure 50: MEX6200 Software Upgrade Webpage**



## Appendix B: Strict Security Mode

### B.1 Overview

Strict mode is a security state of a system complying with the NIST SP 800-131A standard. Because of compatibility issues, strict mode is not the default state of the system and it should be manually set. Strict mode is based on NIST SP 800-131A document which defines cryptographically “acceptable” technologies. This document explains how to configure possible cryptographic vulnerabilities in the system to use secure technologies.



Some protocols, however, cannot be operated in a manner that complies with the standard.

### B.2 Web Certificate

Mellanox supports signature generation of sha256WithRSAEncryption, sha1WithRSAEncryption self-signed certificates, and importing certificates as text in PEM format.

➤ **To configure a default certificate:**

**Step 1.** Create a new sha256 certificate. Run:

```
switch (config) # crypto certificate name <cert name> generate self-signed hash-algorithm sha256
```



For more details and parameters refer to the command crypto certificate name in the MLNX-OS User Manual.

**Step 2.** Show crypto certificate detail. Run:

```
switch (config) # show crypto certificate detail
```

Search for “signature algorithm” in the output.

**Step 3.** Set this certificate as the default certificate. Run:

```
switch (config) # crypto certificate default-cert name <cert name>
```

➤ **To configure default parameters and create a new certificate:**

**Step 1.** Define the default hash algorithm. Run:

```
switch (config) # crypto certificate generation default hash-algorithm sha256
```

**Step 2.** Generate a new certificate with default values. Run:

```
switch (config) # crypto certificate name <cert name> generate self-signed
```



When no options are selected, the generated certificate uses the default values for each field.

To test strict mode connect to the WebUI using HTTPS and get the certificate. Search for “signature algorithm”.



There are other ways to configure the certificate to sha256. For example, it is possible to use certificate generation default hash-algorithm and then regenerate the certificate using these default values. Please refer to the MLNX-OS User Manual for further details.



It is recommended to delete browsing data and previous certificates before retrying to connect to the WebUI.



Make sure not to confuse “signature algorithm” with “Thumbprint algorithm”.

## B.3 Code Signing

Code signing is used to verify that the data in the image is not modified by any third-party. MLNX-OS supports signing the image files with SHA256, RSA2048 using GnuPG.



Strict mode is operational by default.

## B.4 SNMP

SNMPv3 supports configuring username, authentication keys and privacy keys. For authentication keys it is possible to use MD5 or SHA. For privacy keys AES or DES are to be used.

- **To configure strict mode, create a new user with HMAC-SHA1-96 and AES-128. Run:**

```
switch (config) # snmp-server user <username> v3 auth sha <password1> priv aes-128 <password2>
```

- **To verify the user in the CLI, run:**

```
switch (config) # show snmp user
```



To test strict mode, configure users and check them using the CLI, then run an SNMP request with the new users.  
For more information please refer to the MLNX-OS User Manual.



SNMPv1 and SNMPv2 are not considered to be secure. To run in strict mode, only use SNMPv3.



## B.5 SSH

The SSH server on the switch by default uses secure and unsecure ciphers, message authentication code (MAC), key exchange methods, and public key algorithm. When configuring SSH server to strict mode, the aforementioned security methods only use approved algorithms as detailed in the NIST 800-181A specification and the user can connect to the switch via SSH in secure mode only.

➤ **To enable strict security mode, run:**

```
switch (config) # ssh server security strict
```

The no form of the command disables strict security mode.

Make sure to configure the SSH server to work with minimum version 2 since 1 is vulnerable to security breaches.

➤ **To configure min-version to strict mode, run:**

```
switch (config) # ssh server min-version 2
```



Once this is done, the user cannot revert back to minimum version 1.

## B.6 HTTPS

By default, Mellanox switch supports HTTPS encryption using TLS1.0 up to TLS1.2. To work in strict mode you must configure the system to use TLS1.2. Working in TLS1.2 mode also bans MD5 ciphers which are not allowed per NIST 800-131a. In strict mode, the switch supports encryption with TLS1.2 only with the following supported ciphers:

- RSA\_WITH\_AES\_128\_CBC\_SHA256
- RSA\_WITH\_AES\_256\_CBC\_SHA256
- DHE\_RSA\_WITH\_AES\_128\_CBC\_SHA256
- DHE\_RSA\_WITH\_AES\_256\_CBC\_SHA256
- TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256
- TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384
- TLS\_DHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256
- TLS\_DHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384

➤ **To enable all encryption methods, run:**

```
switch (config) # web https ssl ciphers all
```

➤ **To enable only TLS ciphers (enabled by default), run:**

```
switch (config) # web https ssl ciphers TLS
```

➤ **To enable HTTPS strict mode, run:**

```
switch (config) # web https ssl ciphers TLS1.2
```

➤ **To verify which encryption methods are used, run:**

```
switch (config)# show web
Web User Interface:
 Web interface enabled: yes
 HTTP enabled: yes
 HTTP port: 80
 HTTP redirect to HTTPS: no
 HTTPS enabled: yes
 HTTPS port: 443
 HTTPS ssl-ciphers: TLS1.2
 HTTPS certificate name: default-cert
 Listen enabled: yes
 No Listen Interfaces.

 Inactivity timeout: disabled
 Session timeout: 2 hr 30 min
 Session renewal: 30 min

Web file transfer proxy:
 Proxy enabled: no

Web file transfer certificate authority:
 HTTPS server cert verify: yes
 HTTPS supplemental CA list: default-ca-list
switch (config)#
```

On top of enabling HTTPS, to prevent security breaches HTTP must be disabled.

➤ **To disable HTTP, run:**

```
switch (config)# no web http enable
```

## B.7 LDAP

By default, Mellanox switch supports LDAP encryption SSL version 3 or TLS1.0 up to TLS1.2. The only banned algorithm is MD5 which is not allowed per NIST 800-131a. In strict mode, the switch supports encryption with TLS1.2 only with the following supported ciphers:

- DHE-DSS-AES128-SHA256
- DHE-RSA-AES128-SHA256
- DHE-DSS-AES128-GCM-SHA256
- DHE-RSA-AES128-GCM-SHA256
- DHE-DSS-AES256-SHA256
- DHE-RSA-AES256-SHA256
- DHE-DSS-AES256-GCM-SHA384
- DHE-RSA-AES256-GCM-SHA384
- ECDH-ECDSA-AES128-SHA256
- ECDH-RSA-AES128-SHA256
- ECDH-ECDSA-AES128-GCM-SHA256

- ECDH-RSA-AES128-GCM-SHA256
- ECDH-ECDSA-AES256-SHA384
- ECDH-RSA-AES256-SHA384
- ECDH-ECDSA-AES256-GCM-SHA384
- ECDH-RSA-AES256-GCM-SHA384
- ECDHE-ECDSA-AES128-SHA256
- ECDHE-RSA-AES128-SHA256
- ECDHE-ECDSA-AES128-GCM-SHA256
- ECDHE-RSA-AES128-GCM-SHA256
- ECDHE-ECDSA-AES256-SHA384
- ECDHE-RSA-AES256-SHA384
- ECDHE-ECDSA-AES256-GCM-SHA384
- ECDHE-RSA-AES256-GCM-SHA384
- AES128-SHA256
- AES128-GCM-SHA256
- AES256-SHA256
- AES256-GCM-SHA384

➤ **To enable LDAP strict mode, run:**

```
switch (config) # ldap ssl mode {start-tls | ssl}
```



Both modes operate using SSL. The difference lies in the connection initialization and the port used.

➤ **To enable all encryption methods (enabled by default), run:**

```
switch (config) # ldap ssl ciphers TLS1.2
```

➤ **To verify which encryption methods are used, run:**

```
switch (config)# show ldap
User base DN : ou=People,dc=test,dc=com
User search scope : subtree
Login attribute : uid
Bind DN : cn=manager,dc=test,dc=com
Bind password : *****
Group base DN :
Group attribute : member
LDAP version : 3
Referrals : yes
Server port : 389 (not active)
Search Timeout : 5
```

```

Bind Timeout : 5
SSL mode : ssl
Server SSL port : 636
SSL ciphers : TLS1.2
SSL cert verify : yes
SSL ca-list : default-ca-list

LDAP servers:
1: 10.134.47.5
switch (config)#

```



Please make sure that “(not active)” does not appear adjacent to the line “SSL ciphers”.

## B.8 Password Hashing

To comply with NIST 800-131a, Mellanox switches support password encryption with SHA512 algorithm.

➤ **To see the password encryption used, run:**

```

switch (config)# show usernames

```

| USERNAME | FULL NAME            | CAPABILITY | ACCOUNT STATUS                 |
|----------|----------------------|------------|--------------------------------|
| admin    | System Administrator | admin      | No password required for login |
| monitor  | System Monitor       | monitor    | Password set (SHA512)          |
| xmladmin | XML Admin User       | admin      | No password required for login |
| xmluser  | XML Monitor User     | monitor    | No password required for login |



Using default usernames and passwords or using usernames without passwords is highly not recommended.

When moving to strict mode, the password of each user must be reconfigured to a non-default value using the CLI command `username`.

For example, if you have a user ID “myuser” whose password is hashed with MD5, this user must be recreated manually using the command “`username myuser password mypassword`”. The password then is automatically hashed using SHA512.

The following output demonstrates the example above:

```

switch (config)# show usernames

```

| USERNAME | FULL NAME            | CAPABILITY | ACCOUNT STATUS                 |
|----------|----------------------|------------|--------------------------------|
| admin    | System Administrator | admin      | No password required for login |
| myuser   | System Monitor       | monitor    | Password set (MD5)             |

```

switch (config)# username myuser password mypassword
switch (config)# show usernames

```

| USERNAME | FULL NAME            | CAPABILITY | ACCOUNT STATUS                 |
|----------|----------------------|------------|--------------------------------|
| admin    | System Administrator | admin      | No password required for login |
| myuser   | System Monitor       | monitor    | Password set (SHA512)          |