AMI Configuration Commands Reference Manual

MANU0265-02 - Rev. A - 12/19/97

Software Version 5.1.x

FORE Systems, Inc.

1000 FORE Drive
Warrendale, PA 15086-7502
Phone: 412-742-4444
FAX: 412-742-7742

http://www.fore.com

Legal Notices

FCC CLASS A NOTICE

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void this user's authority to operate this equipment.

NOTE: The ASX-200WG, the ASX-200BX, the ASX-1000, and the *ForeRunnerLE* 155 have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

DOC CLASS A NOTICE

This digital apparatus does not exceed Class A limits for radio noise emission for a digital device as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

VCCI CLASS 1 NOTICE

この装置は、第一種情報処理装置（商工業地域において使用されるべき情報処理装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

This equipment is in the Class 1 category (Information Technology Equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Information Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas.Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.

FCC REQUIREMENTS (Notice to Users of DS1 Service)

The following instructions are provided to ensure compliance with the Federal Communications Commission (FCC) Rules, Part 68.

(1) This device must only be connected to the DS1 network connected behind an FCC Part 68 registered channel service unit. Direct connection is not allowed.

(2) Before connecting your unit, you must inform the telephone company of the following information:

Port ID	REN/SOC	FIC	USOC
NM-6/DS1C	6.0N	04DU9-BN, 04DU9-DN,	RJ48C
NM-2/DS1C	6.0N	04DU9-1ZN, and 04DU9-1SN	RJ48C

(3) If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if your equipment or the telephone line is the source of the trouble. If your equipment needs repair, it should not be reconnected until it is repaired.

(4) If the telephone company finds that this equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give you advance notice if possible.

(5) Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.

(6) If the telephone company alters their equipment in a manner that will affect use of this device, they must give you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.

CANADIAN IC CS-03 COMPLIANCE STATEMENT

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

E1 AND E3 NOTICE

The E1 (NM-6/E1C and NM-2/E1C) and E3 (NM-4/E3C and NM-2/E3C) network modules that are described in this manual are approved for use in FORE Systems' host systems providing that the instructions below are strictly observed. Failure to follow these instructions invalidates the approval.

Pan European Approval - CE Marking

Pan European approval of the E1 network module was issued by BABT following assessment against CTR12. This means that it can be connected to ONP and unstructured PTO-provided private circuits with 120 Ω interfaces in all European countries, according to Telecommunications Terminal Equipment (TTE) Directive 91/263/EEC. Thus, the following CE mark applies:

CE168X

The E1 and E3 network modules conform to safety standard EN60950 1992 following the provisions of Low Voltage Product Safety Directive 73/23/EEC and CE Marking Directive 93/68/EEC, and can be marked accordingly with the CE symbol.

The E1 and E3 network modules conform to EN55022 1994 and EN50082-1 1992 following the provisions of the EMC Directive 89/336/EEC, and can be marked accordingly with the CE symbol.

National Approvals

UK

Network Module	Connects to	Approval Number
E1	Structured and unstructured PTO-provided private circuits with 75 Ω interfaces	AA60953
E3	PTO-provided private circuits with 75 Ω interfaces	NS/4387/1/T/605954

Germany

Network Module	Connects to	Approval Number
E3	Structured PTO-provided private circuits with 75 Ω interfaces	A127535H for the ASX-1000 A127534H for the ASX-200BX or ASX-200WG

Switzerland

Network Module	Connects to	Approval Number
E1	Structured PTO-provided private circuits with 120 Ω interfaces	96.0872.J.N
E3	Structured PTO-provided private circuits with 75 Ω interfaces	96.0873.J.N

Required User Guide Statements - UK Installation

The use of auxiliary products not authorized by FORE Systems in FORE Systems ATM Switches may cause the power specification to be exceeded and is a potential safety hazard.

The equipment must be installed such that with the exception of the connections to the host, clearance and creepage distances shown in the table below are maintained between the network module and any other assemblies which use or generate a voltage shown in the table below. The larger distance shown in brackets applies where the local environment within the host is subject to conductive pollution or dry non-conductive pollution which could become conductive due to condensation. Failure to maintain these minimum distances invalidates the approval.

Clearance (mm)	Creepage (mm)	Voltage Used or Generated by Host or by Network Modules
2.0	2.4 (3.8)	Up to 50 V_{rms} or V_{dc}
2.6	3.0 (4.8)	Up to 125 V_{rms} or V_{dc}
4.0	5.0 (8.0)	Up to 250 V_{rms} or V_{dc}
4.6	6.4 (10.0)	Up to 300 V_{rms} or V_{dc}
For a host or other expansion card fitted in the host, using or generating voltages greater than 300V (rms or dc), advice from a competent telecommunications engineer must be obtained before installation of the relevant equipment.		Above 300 V_{rms} or V_{dc}

NOTE: Installing the network modules in the appropriate FORE Systems hosts, according to the installation instructions provided, satisfies the requirements listed above.

The following tables show the available ports and their safety status:

NM-6/E1C and NM-2/E1C

Ports	Safety Status
E1 Ports	TNV operating at SELV
Bus Connector	SELV

NM-4/E3C and NM-2/E3C

Ports	Safety Status
E3 Ports	TNV operating at SELV
Bus Connector	SELV

CE NOTICE

Marking by the symbol **CE** indicates compliance of this system to the EMC (Electromagnetic Compatibility) directive of the European Community and compliance to the Low Voltage (Safety) Directive. Such marking is indicative that this system meets or exceeds the following technical standards:

- EN 55022 - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."
- EN 50082-1 - "Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC 1000-4-2 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements."
- IEC 1000-4-3 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiate electromagnetic field requirements."
- IEC 1000-4-4 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements."

SAFETY CERTIFICATIONS

ETL certified to meet Information Technology Equipment safety standards UL 1950, CSA 22.2 No. 950, and EN 60950.

Table of Contents

Preface

This manual provides the technical information needed to configure the ATM Management Interface (AMI) for the *ForeRunner*™ family of ATM Switches, TNX ATM Switches, and *ForeRunnerLE* Switches. This document was created for users with various levels of experience. If you have any questions or problems, please contact FORE Systems' Technical Support.

Chapter Summaries

Chapter 1 - AMI Configuration Commands - Contains a text and graphical description of the configuration level AMI commands.

Related Manuals

Descriptions of the root, display, operation, and statistics level AMI commands can be found in the *ATM Management Interface (AMI) Manual*. Descriptions of the debug level AMI commands can be found in the *ATM Switch Diagnostics and Troubleshooting Manual* for your switch.

Technical Support

In the U.S.A., you can contact FORE Systems' Technical Support by any one of four methods:

1. If you have access to the Internet, you may contact FORE Systems' Technical Support via e-mail at:

   support@fore.com

2. You may telephone your questions to "support" at:

   800-671-FORE or **412-635-3700**

3. You may FAX your questions to "support" at:

   412-742-7900

4. You may send questions, via U.S. Mail, to:

   FORE Systems, Inc.
   1000 FORE Drive
   Warrendale, PA 15086-7502

Technical support for non-U.S.A. customers should be handled through your local distributor.

No matter which method is used for technical support, please be prepared to provide your support contract ID number, the serial number(s) of the product(s), and as much information as possible describing your problem / question.

Typographical Styles

Throughout this manual, all specific commands meant to be entered by the user appear on a separate line in bold typeface. In addition, use of the `Enter` or `Return` key is represented as `<ENTER>`. The following example demonstrates this convention:

`cd /usr <ENTER>`

File names that appear within the text of this manual are represented in the following style: "...the `fore_install` program installs this distribution."

Command names that appear within the text of this manual are represented in the following style: "...using the **`flush-cache`** command clears the bridge cache."

Subsystem names that appear within the text of this manual are represented in the following style: "...to access the **`bridge`** subsystem..."

Parameter names that appear within the text of this manual are represented in the following style: "...using *`<seg-list>`* allows you to specify the segments for which you want to display the specified bridge statistics."

Any messages that appear on the screen during software installation and network interface administration are shown in `Courier` font to distinguish them from the rest of the text as follows:

```
.... Are all four conditions true?
```

Important Information Indicators

To call your attention to safety and otherwise important information that must be reviewed to ensure correct and complete installation, as well as to avoid damage to the FORE Systems product or to your system, FORE Systems utilizes the following *WARNING/CAUTION/NOTE* indicators.

WARNING statements contain information that is critical to the safety of the operator and/or the system. Do not proceed beyond a ***WARNING*** statement until the indicated conditions are fully understood or met. This information could prevent serious injury to the operator, damage to the FORE Systems product, the system, or currently loaded software, and is indicated as follows:

WARNING!

Hazardous voltages are present. To reduce the risk of electrical shock and danger to personal health, follow the instructions carefully.

CAUTION statements contain information that is important for proper installation/operation. Compliance with **CAUTION** statements can prevent possible equipment damage and/or loss of data and are indicated as follows:

CAUTION

You risk damaging your equipment and/or software if you do not follow these instructions.

NOTE statements contain information that has been found important enough to be called to the special attention of the operator and is set off from the text as follows:

If you change the value of the LECS control parameters while the LECS process is running, the new values do not take effect until the LECS process is stopped, and then restarted.

Invisible Laser Radiation Notice

Class 1 Laser Product:
This product conforms to applicable requirements of 21 CFR 1040 at the date of manufacture.

Class 1 lasers are defined as products which do not permit human access to laser radiation in excess of the accessible limits of Class 1 for applicable wavelengths and durations. These lasers are safe under reasonably foreseeable conditions of operation. Do not view beam with optical instruments.

Single mode fiber optic network modules contain a Class 1 laser.

This Laser Notice section only applies to products or components containing Class 1 lasers.

Safety Precautions

For your protection, observe the following safety precautions when setting up equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. FORE Systems, Inc., is not responsible for regulatory compliance of a modified FORE product.

CHAPTER 1 AMI Configuration Commands

This chapter contains a detailed description of the AMI **configuration** commands. The main configuration menu can be found at the root level. There are several commands available under **configuration**. Commands that are submenus are immediately followed by a ">" symbol. Typing **configuration ?** at the prompt at the root level displays the **configuration** commands as follows:

```
myswitch::> configuration ?
  alarms>          atmarp>          atmroute>        board>
  cec>             ces>             ilmiproxy>       ip>
  lane>            module>          nsap>            port>
  qos>             qosext>          rs232>           security>
  snmp>            spans>           spvc>            switch>
  system>          timing>          signalling>      upc>
  vcc>             vpc>             vpt>
```

Each of these commands has a submenu of commands which are described in the following subsections.

1.1 Alarms Configuration Commands

This submenu allows you to configure alarms. You can display the list of available subcommands by typing **alarms ?** at the **configuration** level.

```
myswitch::configuration> alarms ?
  show             enable           disable          reset
  module>
```

1.1.1 Displaying Alarm Conditions

This command lets you display the status of all alarms. The `linkFailed`, `spansFailed`, `netmodRemovedHighPrio`, and `netmodRemovedLowPrio` alarms are available on all switches. The `powerSupplyInputFailed` and `tempSensorOverTemp` alarms are available on all switches, except an LE 155. The `powerSupplyOutputFailed` alarm is only available on an ASX-200BX, an ASX-1000, a TNX-210, and a TNX-1100. The `fanBankFailed` alarm is only available on an ASX-1000 and a TNX-1100. The `powerSupplyOverCurrent` and `powerSupply5VoltFailed` alarms are only available on a DC-powered ASX-1000 and TNX-1100. Enter the following parameters:

```
myswitch::configuration alarms> show
AlarmType                     AlarmStatus    MinorAlarm   MajorAlarm
powerSupplyInputFailed        inactive       disabled     enabled
powerSupplyOutputFailed       inactive       disabled     enabled
fanBankFailed                 inactive       disabled     enabled
tempSensorOverTemp            inactive       disabled     enabled
linkFailed                    inactive       enabled      disabled
spansFailed                   inactive       enabled      disabled
netmodRemovedHighPrio         inactive       disabled     disabled
netmodRemovedLowPrio          inactive       disabled     disabled
Major alarm relay status: off
Minor alarm relay status: off
```

The fields in this display are defined as follows:

Field	Description
AlarmType	The name of the alarm.
AlarmStatus	Shows if the state of the alarm is active (alarming) or inactive (not alarming). An alarm is active if the underlying condition is detected. For power supplies, the input failed alarm condition is active if the input voltage is not within the nominal range for the supply. This does not necessarily mean that an output failure will result. A power supply output failure condition is active if any power supply is failing or if it is physically removed.
MinorAlarm	**`Disabled`** means that this alarm type will not cause a minor alarm. **`Enabled`** means that this alarm type will cause a minor alarm.
MajorAlarm	**`Disabled`** means that this alarm type will not cause a major alarm. **`Enabled`** means that this alarm type will cause a major alarm.
Major alarm relay status	**`Off`** means that no major alarms are currently active. **`On`** means that one or more major alarms are currently active. Look at the AlarmStatus field to see which condition is in a state of alarm.
Minor alarm relay status	**`Off`** means that no minor alarms are currently active. **`On`** means that one or more minor alarms are currently active. Look at the AlarmStatus field to see which condition is in a state of alarm.

1.1.2 Enabling an Alarm

This command lets you enable an alarm. Enter the following parameters:

```
myswitch::configuration alarms> enable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major	Indicates that the designated alarm type causes a major alarm when that condition occurs.
minor	Indicates that the designated alarm type causes a minor alarm when that condition occurs.
alarm type	Indicates the kind of alarm condition. Valid alarm types are displayed in the AlarmType field for **configuration alarms show**.

For example, to enable an overtemperature condition that is detected by the overtemperature sensor as a major alarm, enter the following parameters:

```
myswitch::configuration alarms> enable major tempSensorOverTemp
```

To verify that the change has taken effect, you can display the alarms:

```
myswitch::configuration alarms> show
AlarmType                     AlarmStatus    MinorAlarm   MajorAlarm
powerSupplyInputFailed        inactive       disabled     enabled
powerSupplyOutputFailed       inactive       disabled     enabled
fanBankFailed                 inactive       disabled     enabled
tempSensorOverTemp            inactive       disabled     enabled
linkFailed                    inactive       enabled      disabled
spansFailed                   inactive       enabled      disabled
netmodRemovedHighPrio         inactive       disabled     disabled
netmodRemovedLowPrio          inactive       disabled     disabled
Major alarm relay status: off
Minor alarm relay status: off
```

1.1.3 Disabling an Alarm

This command lets you disable an alarm. Enter the following parameters:

```
myswitch::configuration alarms> disable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major	Indicates that a major alarm is being disabled.
minor	Indicates that a minor alarm is being disabled.
alarm type	Indicates the kind of alarm condition. Valid alarm types are displayed in the `AlarmType` field for **`configuration alarms show`**.

For example, to disable a link failure as a minor alarm, enter the following parameters:

```
myswitch::configuration alarms> disable minor linkFailed
```

To verify that the change has taken effect, you can display the alarms:

```
myswitch::configuration alarms> show

AlarmType                    AlarmStatus    MinorAlarm   MajorAlarm
powerSupplyInputFailed       inactive       disabled     enabled
powerSupplyOutputFailed      inactive       disabled     enabled
fanBankFailed                inactive       disabled     enabled
tempSensorOverTemp           inactive       disabled     enabled
linkFailed                   inactive       disabled     enabled
spansFailed                  inactive       enabled      disabled
netmodRemovedHighPrio        inactive       disabled     disabled
netmodRemovedLowPrio         inactive       disabled     disabled
Major alarm relay status: off
Minor alarm relay status: off
```

1.1.4 Resetting an Alarm

This command lets you reset either the `linkFailed` alarm, the `spansFailed` alarm, or both alarms. Enter the following parameters:

```
myswitch::configuration alarms> reset (<alarm type> | all)
```

These parameters are defined as follows:

Parameter	Description
alarm type	Indicates which alarm to reset. Can be either `linkFailed` or `spansFailed`.
all	Indicates that both the `linkFailed` and the `spansFailed` alarms will be reset.

For example, to reset the `linkFailed` alarm, enter the following parameters:

```
myswitch::configuration alarms> reset linkFailed
Alarm linkFailed reset.
```

To verify that the change has taken effect, you can display the alarms:

```
myswitch::configuration alarms> show
AlarmType                     AlarmStatus    MinorAlarm   MajorAlarm
powerSupplyInputFailed        inactive       disabled     enabled
powerSupplyOutputFailed       inactive       disabled     enabled
fanBankFailed                 inactive       disabled     enabled
tempSensorOverTemp            inactive       disabled     enabled
linkFailed                    inactive       enabled      disabled
spansFailed                   active         enabled      disabled
netmodRemovedHighPrio         inactive       disabled     disabled
netmodRemovedLowPrio          inactive       disabled     disabled
Major alarm relay status: off
Minor alarm relay status: on
```

1.1.5 Network Module Alarm Commands

These commands, used in conjunction with the **conf alarm enable** and **disable** commands, allow you to configure alarms that notify you of the physical removal of a network module from a particular slot in the switch fabric. You can display the list of available subcommands by typing **module ?** at the alarms level.

```
myswitch::configuration alarms> module ?
  show             assign
```

1.1.5.1 Displaying the Network Module Alarm Configuration

This command lets you display the current configuration of the network module alarms. Enter the following parameters:

```
myswitch::configuration alarms module> show
 NetmodSlot   NetmodPrio   NetmodStatus
 A            none         present
 B            high         present
 C            low          present
 D            none         absent
```

The fields in this display are defined as follows:

Field	Description
NetmodSlot	The network module slot in the switch fabric.
NetmodPrio	The priority assigned to this slot. Can be none, high, or low. high means that the netmodRemovedHighPrio alarm is activated when a network module is removed from that slot. low means that the netmodRemovedLowPrio alarm is activated when a network module is removed from that slot. none means that no alarm is activated when a network module is removed from that slot. The default is none.
NetmodStatus	Shows present or absent depending on whether or not a network module is currently installed in that slot.

1.1.5.2 Configuring Network Module Alarm Priorities

This command lets you configure priorities for the network module alarms for each slot in the switch fabric. There are four slots labeled A, B, C, and D. These alarms alert you when a network module has been removed from that slot. Enter the following parameters:

```
myswitch::configuration alarms module> assign <slot> <priority>
```

These parameters are defined as follows:

Parameter	Description
slot	The slot in the switch fabric for which you want to configure an alarm priority. Can be A, B, C, or D.
priority	The priority you want to assign to the slot. Each slot in the fabric may be assigned a different priority: high, low, or none. high means that the netmodRemovedHighPrio alarm is activated when a network module is removed from that slot. low means that the netmodRemovedLowPrio alarm is activated when a network module is removed from that slot. none means that no alarm is activated when a network module is removed from that slot. The default is none.

For example, to configure slot D with a high priority, enter:

```
myswitch::configuration alarms module> assign D high
```

This assigns a high priority to slot D. Then you need to decide if you want the high priority to be a major or minor alarm (the major and minor alarms for network module removal are disabled by default), and enable it as such, as follows:

```
myswitch::configuration alarms> enable major netmodRemovedHighPrio
```

This makes the high priority a major alarm. If a network module is then removed from slot D, the NetmodStatus field shows absent as follows:

```
myswitch::configuration alarms module> show
 NetmodSlot   NetmodPrio   NetmodStatus
 A            none         present
 B            none         present
 C            low          present
 D            high         absent
```

Also, the `AlarmStatus` for `netmodRemovedHighPrio` is `active` and the Major alarm relay status is `on` as follows:

```
myswitch::configuration alarms> show
AlarmType                     AlarmStatus    MinorAlarm   MajorAlarm
powerSupplyInputFailed        inactive       disabled     enabled
powerSupplyOutputFailed       inactive       disabled     enabled
fanBankFailed                 inactive       disabled     enabled
tempSensorOverTemp            inactive       disabled     enabled
linkFailed                    inactive       enabled      disabled
spansFailed                   inactive       enabled      disabled
netmodRemovedHighPrio         active         disabled     enabled
netmodRemovedLowPrio          inactive       enabled      disabled
Major alarm relay status: on
Minor alarm relay status: off
```

1.2 ATM ARP Configuration Commands

These commands allow you to manage the ATM ARP (address resolution protocol) features. You can display the list of available subcommands by typing **?** at the **atmarp** level.

```
myswitch::configuration atmarp> ?
arpserver>       delete           flush            getnsap
mapnsap          newclassicalip   newforeip        show
```


1.2.1 ARP Server Configuration Commands

These commands let you configure the RFC-1577 ATM ARP server. You can get to this level by entering `arpserver` at the configuration level. By entering **?** at the **arpserver** level, the list of available subcommands for `arpserver` is displayed.

```
myswitch::configuration atmarp arpserver> ?
  show              set
```

1.2.1.1 Displaying the ARP Server Address

This command shows which interfaces are enabled to be the RFC-1577 ATM ARP server for the IP network. Enter the following parameters:

```
myswitch::configuration atmarp arpserver> show <interface>
myswitch::configuration atmarp arpserver> show
Interface   ARP Server Addr                                    Enabled
qaa0        0x47.0005.80.ffe100.0000.f21a.3445.0020481a3445.00 Yes
qaa1        0x47.0005.80.ffe100.0000.f21a.3445.0020481a3445.01 Yes
qaa2        0x47.0005.80.ffe100.0000.f21c.06db.0020481c06db.02 No
qaa3        0x47.0005.80.ffe100.0000.f21a.3445.0020481a3445.03 Yes
```

The fields in this display are defined as follows:

Field	Description
Interface	The classical IP interfaces for this switch.
ARP Server Addr	The ARP server address for this interface.
Enabled	Shows whether or not ARP server service is enabled for this interface.

1.2.1.2 Setting the ARP Server Address

This command allows you to set the address of the RFC-1577 ATM ARP server. Enter the following parameters:

```
myswitch::configuration atmarp arpserver> set <NSAPaddress> [<interface>]
```

These parameters are defined as follows:

Parameter	Description
NSAPAddress	The ATM network layer address for the RFC-1577 ATM ARP server.
interface	Enter the Classical IP interface that will be the arpserver: `qaa0`, `qaa1`, `qaa2`, or `qaa3`. The default is qaa0.

The switch itself can be used as an ARP server. To do this, set the ARP server address to be the NSAP address of the switch's control port (port CTL).

1.2.2 Deleting an ARP Entry

This command allows you to remove an ARP entry from the ATM ARP cache. Enter the following parameters:

```
myswitch::configuration atmarp> delete <host>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the endstation for which the outgoing ARP entry is to be deleted.

If you have ILMI enabled on your switch, ILMI creates an ATM ARP cache entry for each address that it registers. These entries cannot be deleted using this command.

1.2.3 Flushing the ATM ARP Cache

This command enables you to delete the contents of the ATM ARP cache. Only dynamic ARP cache entries are removed. The switch asks you to verify that flushing the ARP cache is the desired action. Enter the following parameters:

```
myswitch::configuration atmarp> flush
Flush the ATM ARP cache [n]? n
```

To cancel the command, type **n** and press **<ENTER>**, or simply type **<ENTER>**. To flush the ARP cache, type **y** and press **<ENTER>**.

1.2.4 Getting the NSAP Address for a Classical IP Interface

This command displays the NSAP address of a Classical IP interface. Enter the following:

```
myswitch::configuration atmarp> getnsap [<interface>]
qaa0 NSAP address: 47000580ffe1000000f21a34450020481a344500
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the Classical IP interface to be displayed[1]: qaa0, qaa1, qaa2, or qaa3.

1. If no interface is specified, the NSAP address of `qaa0` is displayed.

1.2.5 Creating an IP to NSAP Address Mapping

This command allows you to create an ATM ARP cache entry mapping a particular IP address to its corresponding NSAP address. Enter the following parameters:

```
myswitch::configuration atmarp> mapnsap <host> <NSAPaddress> [<interface>]
```

These parameters are defined as follows:

Parameter	Description
host	The IP address to be mapped.
NSAPaddress	The NSAP address to be mapped.
interface	The Classical IP interface that should be used to open connections to this NSAP address: qaa0, qaa1, qaa2, or qaa3. The default is qaa0.

1.2.6 Creating a Classical IP PVC

This command allows you to create a new Classical IP PVC ARP entry. All data is sent LLC/SNAP encapsulated. Enter the following parameters:

```
myswitch::configuration atmarp> newclassicalip <host> <vpi> <vci> [<interface>]
```

These parameters are defined as follows:

Parameter	Description
host	The host IP address of the remote IP endstation.
vpi	The virtual path number of the Classical IP PVC.
vci	The virtual channel number of the Classical IP PVC.
interface	The Classical IP interface to be used for this connection: qaa0, qaa1, qaa2, or qaa3. The default is qaa0.

1.2.7 Creating a FORE IP PVC ARP Entry

This command enables you to create a FORE IP PVC ARP entry. Data on this PVC is encapsulated using null encapsulation (also known as VC-based multiplexing) as specified in RFC-1483. Enter the following parameters:

```
myswitch::conf atmarp> newforeip <host> <vpi> <vci> (4|5) [<interface>]
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the remote host.
vpi	The virtual path number of the FORE IP PVC. Must be 0.
vci	The virtual channel number of the FORE IP PVC.
4 | 5	The connection's ATM Adaptation Layer (AAL) type. The default is 4.
interface	The FORE IP interface to be used for this connection. The default is asx0.

1.2.8 Displaying the ATM ARP Entries

This command displays the current ATM ARP cache. Enter the following parameters:

```
myswitch::configuration atmarp> show
myswitch::configuration atmarp>
```

When the prompt is returned with no information displayed, as shown above, then the ATM ARP cache is empty.

The following is an example of an ATM ARP cache.

```
myswitch::configuration atmarp> show
IPaddress        If    VPI   VCI   AAL    Type              Direction
198.29.22.9      asx0  0     63    aal5   foreIpSVC         outgoing
198.29.22.15     asx0  0     231   aal5   foreIpSVC         pending
198.29.22.37     asx0  0     65    aal34  foreIpSVC         pending
IPaddress        If    NSAP Address
198.29.17.3      qaa0  0x47.0005.80.ffe100.0000.f21b.0138.002048102754.00
198.29.17.10     qaa0  0x47.0005.80.ffe100.0000.f21b.0137.002048100be6.00
198.29.17.15     qaa0  0x47.0005.80.ffe100.0000.f21b.0137.00204810048d.00
198.29.17.52     qaa0  0x47.0005.80.ffe100.0000.f21b.0138.0020481b0138.00
```

The fields in this display are defined as follows:

Field	Description
IPaddress	The IP address for this connection.
If	The name of the IP interface for this connection.
VPI	The virtual path number.
VCI	The virtual channel number.
AAL	The AAL type of the given connection.
Type	Shows what kind of connection this is. Can be `foreIpPVC`, `foreIpSVC`, `classicalIpPVC`, or `classicalIpSVC`.
Direction	`Outgoing` means this is an outgoing connection. `Incoming` means this is an incoming connection. `Pending` means that a connection has not (yet) been established. `Incomplete` means that the IP-to-ATM address mapping is not yet known for the given IP address.
NSAP Address	The NSAP address for this connection.

1.3 ATM Route Configuration Commands

These commands let you configure ATM routing on a switch. You can display the list of available subcommands by typing **?** at the **atmroute** level.

```
myswitch::configuration atmroute> ?
  show               domain>           ftpnni>           pnni>
  policy>            spans>
```

1.3.1 Displaying ATM Routing Information

This command lets you display all of the ATM routing information from various menus in one screen. Enter the following parameters:

```
myswitch::configuration atmroute> show
 Port VPI  Node   Domain SigProto       SigSt  NodeSt HelloSt       PeerSt
 1B1  0    ftpnni 1      FT-PNNI(a)     up     up     N/A           N/A
 1B2  0    1      1      privateUNI(a)  up     up     attempt       N/A
 1B3  0    1      1      privateUNI(a)  up     up     attempt       N/A
 1B4  0    1      1      privateUNI(a)  up     up     attempt       N/A
 1CTL 0    N/A    1      privateUNI(a)  up     N/A    N/A           N/A
```

The fields in this display are defined as follows:

Field	Description
Port	The port through which the link is attached to the node.
VPI	The virtual path number on the port.
Node	For FT-PNNI, shows `ftpnni`. For PNNI, shows the index number of the node for which the ATM routing information is being displayed.
Domain	The index number of the domain to which this node belongs.
SigProto	The signalling protocol being used on this port. **(a)** means that the switch is trying to automatically configure the protocol and version of that protocol that its peers are using.
SigSt	The current state of this interface. If the state is **up**, this interface is operational. This is the normal state for a interface that is connected to another FORE Systems' ATM switch or host. If the state is **down**, this interface is not operational. This can be due to a lack of a physical connection or due to a software problem.
NodeSt	The administrative state of this node. **up** means the node is active. **down** means the node is inactive.

Field	Description
HelloSt	The state of the hello protocol running between the peer nodes. `down` means that the link is not usable, so no routing packets are sent or received over it. `attempt` means that either no hellos or hellos with mismatch information have been received from the neighbor, and attempts are being made to reach the neighbor by sending hellos at the specified hello interval. `oneWayInside` means that hellos have been received from the neighbor and the neighbor has established that they are peers, but the neighbor's remote node ID and remote port ID are 0. `twoWayInside` means that hellos have been received from the neighbor, the neighbor has established that they are peers, and the neighbor has sent the correct remote node ID and remote port ID. Bi-directional communication can occur over this link. `oneWayOutside` means that hellos have been received from the neighbor and the neighbor has established that they are from different peer groups, but the neighbor's remote node ID and remote port ID are 0. `twoWayOutside` means that hellos have been received from the neighbor, the neighbor has established that they are from different peer groups, and the neighbor has sent the correct remote node ID and remote port ID, but the nodal hierarchy list does not include a common peer group. `commonOutside` means that a common level of the routing hierarchy has been found and bi-directional communication can occur over this link.
PeerSt	`N/A` means the protocol is something other than PNNI, so this field is not applicable. When the protocol is PNNI, shows the state of the database exchange protocol running between this node and the neighboring peer listed. `npdown` means there are no active links to the neighboring peer. `negotiating` means the two peers are deciding which one will start the initial topology database exchange. `exchanging` means this node is sending its topology database to the neighboring node. `loading` means this node is receiving the neighboring node's topology database. `full` means this node has received all PTSEs known to be available from the neighboring peer. Links to the neighboring peer can now be advertised in PTSEs.

You can also display advanced ATM routing information as follows:

```
myswitch::configuration atmroute> show [<port> [<vpi>]] [advanced]
myswitch::configuration atmroute> show advanced
 Port VPI  Node   Domain SigProto       SigSt  NodeSt HelloSt       PeerSt
 1B1  0    ftpnni 1      FT-PNNI(a)     up     up     N/A           N/A
           ConfNode ILMI  ForeLevel   ForeArea   PnniLinkType
           0        up    4           4          N/A
           DomainProto     DomainPrefix
           gateway         0x47.0005.80.ffe100.afce.efed.0000
           FtpnniPgMask    FtpnniPrefix                        Border
           0               0x47.0005.80.ffe100.afce.efed.0000  disabled
 Port VPI  Node   Domain SigProto       SigSt  NodeSt HelloSt       PeerSt
 1B2  0    1      1      privateUNI(a)  up     up     attempt       N/A
           ConfNode ILMI  ForeLevel   ForeArea   PnniLinkType
           1        up    5           5          unknown
           DomainProto     DomainPrefix
           gateway         0x47.0005.80.ffe100.afce.efed.0000
           PnniPgId                            Ptses
           80:47.000580ffe100afcefe000000      3
           PnniNodeId
           80:160:47.000580ffe100afceefed0000.ff1a2d0f0001.00
```

The fields in this display are defined as follows:

Field	Description
ConfNode	The PNNI node index number for a user-configured interface that was created through the **conf atmr pnni interface** menu.
ILMI	**Up** means that ILMI is operational for this interface. **Down** means that ILMI is not operational for this interface.
ForeLevel	The level of the area used in FORE's hierarchy support.
ForeArea	The ID of the area in FORE's hierarchy support to which this node belongs.
PnniLinkType	Shows what kind of PTSE this is. Can be `nodalInformation`, `internalReachableAddresses`, `externalReachableAddresses`, `nodalStateParameters`, `horizontalLinks`, or `uplinks`.
DomainProto	The default protocol used on all Network-to-Network (NNI) interfaces in the domain. `ftpnni` means *ForeThought* PNNI is used for this domain. `pnni` means ATM Forum PNNI is used for this domain. `gateway` means this domain includes both the PNNI and FT-PNNI networks so that reachability information can be leaked dynamically between peer groups of both types. This will be a gateway switch (a switch that has one FT-PNNI node and one PNNI node).

Field	Description
DomainPrefix	The 13-byte prefix of the domain used in ILMI registration, in the FT-PNNI switch prefix, and the PNNI node ID. This prefix is also used as the default 13-byte policy summary.
FtpnniPgMask	The mask that gives the number of leading bits in the switch prefix used to aggregate the addresses that belong to this *ForeThought* PNNI peer group. This field is displayed only if the protocol is FT-PNNI.
FtpnniPrefix	The default NSAP prefix for this ATM switch that is used in the ILMI address registration message and in the hello indication FT-PNNI message. This field is displayed only if the protocol is FT-PNNI.
Border	A border switch has a link to at least one other switch that belongs to a different peer group. A border switch advertises reachability information about its peer group to switches outside of its peer group. `enabled` means this switch acts as a *ForeThought* PNNI border switch. `disabled` means this switch does not act as a *ForeThought* PNNI border switch. This field is displayed only if the protocol is FT-PNNI.
PnniPgId	The peer group ID of the peer group to which this node belongs. This field is displayed only if the protocol is PNNI.
Ptses	The number of PTSEs that belong to this node. This field is displayed only if the protocol is PNNI.
PnniNodeId	The ID of this node. This field is displayed only if the protocol is PNNI.

The first nine fields in this display are defined in the same manner as those listed in the previous **show** command.

1.3.2 Configuring a Domain

These commands allow you to configure a domain on a switch. An ATM routing domain is a group of areas that are configured to dynamically exchange reachability information with one another. This allows connectivity between end systems belonging to different areas. Reachability information is exchanged between domains through static configuration only. A switch may be part of multiple domains and there may be multiple domains configured on a switch. (For more information about domains and areas, see the Network Configuration manual for your switch.) You can display the available subcommands by typing **?** at the **domain** level.

```
myswitch::configuration atmroute domain> ?
  delete          modify          new             show
```

1.3.2.1 Deleting a Domain

This command allows you to delete an existing domain. Enter the following parameters:

```
myswitch::configuration atmroute domain> delete <domain ID>
```

1.3.2.2 Modifying a Domain

This command allows you to modify an existing domain. Enter the following parameters:

```
myswitch::configuration atmroute domain> modify <domain ID> [-name <name>]
[<ftpnni | pnni | gateway>][-prefix <prefix>] [-defsum <enable | disable>]
```

If you modify the domain, the switch prompts for a reboot. You must type **y** and reboot the switch for your change to take effect.

If the existing domain is pnni or gateway, and the prefix of the domain is changed, you must first disable the PNNI node using **conf atmr pnni node admin** *<nodeid>* **down**. This removes any transient routes related to the node address with the old prefix.

1.3.2.3 Creating a Domain

This command allows you to create a new domain. Enter the following parameters:

```
myswitch::configuration atmroute domain> new <domain ID> [-name <name>]
[-prefix <prefix>] [-defsum <enable | disable>]
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
domain ID	The index number of this domain. Displayed in the the `Index` field under **`conf atmroute domain show`**.
name	The optional, user-assigned name of this domain. Displayed in the `Name` field under **`conf atmroute domain show`**.
ftpnni pnni gateway	The default routing protocol to use on all Network-to-Network (NNI) interfaces in the domain. `ftpnni` means *ForeThought* PNNI is used for this domain. `pnni` means ATM Forum PNNI is used for this domain. `gateway` means this domain includes both the PNNI and FT-PNNI networks so that reachability information can be leaked dynamically between peer groups of both types. This will be a gateway switch (a switch that has one FT-PNNI node and one PNNI node). The default routing protocol is `ftpnni`.
prefix	The 13-byte prefix of the domain used in ILMI registration, used in the FT-PNNI switch prefix, and used in determining the PNNI node ID, PNNI peer group, and PNNI ATM address. This prefix is also used as the default 13-byte policy summary. If you have two PNNI domains in a switch, be sure to assign each one a different prefix.
-defsum <enable | disable>	Enables or disables the ability to summarize all local addresses into a default, 10-byte summary switch prefix, and advertise this summary in PNNI as an internal reachable address PTSE and in FT-PNNI topology. Modifying this parameter does not require a reboot; the change takes effect immediately. The default value is `disable`.

1.3.2.4 Displaying Domain Information

This command allows you to display information about all of the existing domains. Enter the following parameters:

```
myswitch::configuration atmroute domain> show
 ID  Name              Defproto   Prefix                                Defsum
 1   default           ftpnni     0x47.0005.80.ffe100.0000.f21a.3445    ENABLED
```

The fields in this display are defined as follows:

Field	Description
ID	The index number of this domain.
Name	The user-assigned name of this domain.
Defproto	The default routing protocol used on all Network-to-Network (NNI) interfaces in the domain. `ftpnni` means *ForeThought* PNNI is used for this switch in this domain. `pnni` means ATM Forum PNNI is used for this switch in this domain. `gateway` means this switch includes both the PNNI and FT-PNNI networks in this domain so that reachability information can be leaked dynamically between peer groups of both types.
Prefix	The address prefix of the domain.
Defsum	Shows if the ability to summarize all local addresses into a default, 10-byte summary switch prefix is enabled or disabled.

1.3.3 *ForeThought* PNNI Configuration Commands

These commands allow you to configure *ForeThought* PNNI on a switch. You can display the list of available subcommands by typing **?** at the **ftpnni** level.

```
myswitch::configuration atmroute ftpnni> ?
  border             dtl>               forearea           forelevel
  hello              maxhop             metric>            minthresh
  nsapindication     pgmask             pgsncost           prefix
  propmult           staticroute>       swmask             vcmark
  show
```

1.3.3.1 Changing the *ForeThought* PNNI Border Switch Functionality

A switch that has a link to another switch that belongs to a different peer group is considered a border switch. A border switch advertises reachability information about its peer group to switches outside of its peer group. You should enable border switch functionality on all switches in a peer group that have direct outside links to other peer groups. This command lets you designate whether or not this switch will act as a *ForeThought* PNNI border switch. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> border (enable | disable)
```

The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

These parameters are defined as follows:

Parameter	Description
enable	Entering `enable` (and rebooting) means that this switch will act as a *ForeThought* PNNI border switch.
disable	Entering `disable` (and rebooting) means that this switch will not act as a *ForeThought* PNNI border switch.

1.3.3.2 DTL Configuration Commands

These commands let you create, delete, and display Designated Transit Lists (DTLs). A DTL is a source route for the *ForeThought* PNNI (FT-PNNI) router which specifies the preferred call routing for the SVC portion of a directed SPVC. A DTL is a source route (index) and each entry (row) in the DTL represents a single hop in the source route. Each hop is represented by a FT-PNNI node and the logical output port at that node. The FT-PNNI node's address is determined by the switch's NSAP prefix and mask. The logical port is determined by the link ID and the VPI. You can display the list of available subcommands by typing **?** at the **dtl** level.

```
myswitch::configuration atmroute ftpnni dtl> ?
  delete          modify          new             show
```


1.3.3.2.1 Deleting a DTL Entry

This command enables you to remove an existing DTL. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni dtl> delete <index> (<row>|all)
```

For example, if you want to delete row 2 of index entry 9, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> delete 9 2
```

Similarly, if you want to delete every row in index entry 9, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> delete 9 all
```

1.3.3.2.2 Modifying a DTL Entry

This command allows you to modify a DTL entry. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni dtl> modify <index> <row>\
(prefix | mask | port | vpi) <new_value>
```

For example, to modify the port of index entry 9, row 2 to port D1, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> modify 9 2 port D1
```

Similarly, to modify the mask of index entry 12, row 1 to a mask of 104, enter the following:

```
myswitch::configuration atmroute ftpnni dtl> modify 12 1 mask 104
```

1.3.3.2.3 Creating a DTL Entry

This command allows you to create a DTL. Enter the following parameters:

```
myswitch::configur atmroute ftpnni dtl> new <index> <row> <prefix> <mask> <port> <vpi>
```

For example, if you want to create a DTL, enter something similar to the following:

```
myswitch::configuration atmroute ftpnni dtl> 10 1 0x47000580ffe1000000f21b19c3 104  C1 0
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
index	The index number of a DTL. Displayed in the `Index` field under **`conf atmroute ftpnni dtl show`**.
row	The row number of the individual entry within a given DTL. An entry in the DTL is given a row number equal to its position in the source route. Thus, the entry corresponding to the first hop is row 1, the second hop is row 2, and so on. Displayed in the `Row` field under **`conf atmroute ftpnni dtl show`**.
all	Used only with the **`delete`** command. Indicates that you want to delete all of the entries within a given DTL.
prefix	Indicates the 13-byte NSAP prefix of the node ID of this DTL entry. In *ForeThought* PNNI, the node IDs are prefixes that represent both the ID of the node and a summary of reachable addresses.
mask	The subnet mask is the significant part of the prefix when matching an address. Gives the length of the above prefix in number of bits. Can vary from 0 - 104 (13 bytes).
port	The output port number for the node given by the above node ID. This is also the port to which the next node in the DTL (if there is one) is connected. You only need to specify the network module and port numbers, not the board number (c1 instead of 1c1).
vpi	The output path number in the above output port. This is the signalling path to the peer given by the next node in the DTL.
new_value	Used only with the **`modify`** command. Indicates the actual value that you wish to use for one of the above parameters. Can be the new prefix, mask, port, or vpi number.

1.3.3.2.4 Displaying DTLs

This command lets you display the current DTLs. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni dtl> show
Index    Row   NSAP prefix                          Mask  Port   VPI
   10      1   0x47.0005.80.ffe100.0000.f21b.19c3    104    C1     0
           2   0x47.0005.80.ffe100.0000.f21b.19a1    104    C2     0
```

The fields in this display are defined as follows:

Field	Description
Index	The index number of each of the current DTLs.
Row	The row number of each entry within each DTL. Each entry in the DTL has a row number equal to its position in the source route, so the entry corresponding to the first hop is row 1, the second hop is row 2, and so on.
NSAP prefix	The NSAP prefix part of the node ID of this DTL entry. In *ForeThought* PNNI, the node IDs are prefixes that represent both the ID of the node and a summary of reachable addresses.
Mask	The mask corresponding to the prefix, which gives the length of the above prefix in number of bits.
Port	The output port for the node given by the above node ID. This is also the port to which the next node in the DTL (if there is one) is connected.
VPI	The output path in the above output port. This is the signalling path to the peer given by the next node in the DTL.

You can also display an individual DTL by entering the following parameters:

```
myswitch::configuration nsap dtl> show [<index>]
myswitch::configuration nsap dtl> show 10
Index    Row   NSAP prefix                          Mask  Port   VPI
   10      1   0x47.0005.80.ffe100.0000.f21b.19c3    104    C1     0
           2   0x47.0005.80.ffe100.0000.f21b.19a1    104    C2     0
```

If no DTLs exist, the following is displayed:

```
myswitch::configuration nsap dtl> show
No DTLs available
```

1.3.3.3 Configuring the FORE Area

This command lets you set the value of the FORE Area ID. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> forearea <forearea>
```

The switch cautions you that a reboot is necessary. It asks if you want to continue with the change in case you made a mistake. To abort the change, type **n** or press **<ENTER>**. No change will be made. To continue with the change, type **y**. If you type **y**, you will be asked if you want to reboot the switch. You must reboot the switch for this change to take effect, so type **y** or press **<ENTER>**.

```
This change requires a reboot to prevent any potential routing problem.
Do you want to continue with the change [n]? y
Reboot the switch [y]? y
```

This parameter is defined as follows:

Parameter	Description
forearea	The ID of the area in the FORE hierarchy to which this *ForeThought* PNNI node belongs. This can be a value between 1 and 127. The default is 4.

1.3.3.4 Configuring the FORE Level

This command lets you set the value of the FORE Level. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> forelevel <forelevel>
```

The switch cautions you that a reboot is necessary. It asks if you want to continue with the change in case you made a mistake. To abort the change, type **n** or press **<ENTER>**. No change will be made. To continue with the change, type **y**. If you type **y**, you will be asked if you want to reboot the switch. You must reboot the switch for this change to take effect, so type **y** or press **<ENTER>**.

```
This change requires a reboot to prevent any potential routing problem.
Do you want to continue with the change [n]? y
Reboot the switch [y]? y
```

This parameter is defined as follows:

Parameter	Description
forelevel	The level of the area to which this *ForeThought* PNNI node belongs in the FORE hierarchy. This can be a value between 1 and 127. The default is 4.

1.3.3.5 Setting the Hello Indication Interval

Hello indication messages are the “keep alive” messages that two switches send to one another to verify their existence. This command lets you change the interval for *ForeThought* PNNI hello indication messages. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> hello <msec>
```

This parameter is defined as follows:

Parameter	Description
hello	The period of time between transmissions of hello indication messages. The default 500 microseconds.

1.3.3.6 Setting the Maximum Hop Count

This command lets you set the maximum hop count for the NSAP router. By setting a maximum hop count, you tell the switch to consider only those paths that have less than or equal to the number of hops specified when setting up a connection. If a connection is routed using a path with a large hop count, there is a greater chance that the connection may experience congestion and be delayed or discarded. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> maxhop <hops>
```

This parameter is defined as follows:

Parameter	Description
maxhop	The maximum number of hops to use when routing a connection for the NSAP router. The default is 20 hops.

1.3.3.7 *ForeThought* PNNI Metric Configuration Commands

These commands allow you to configure *ForeThought* PNNI metric sets. You can display the list of available subcommands by typing **?** at the **metric** level.

```
myswitch::configuration atmroute ftpnni> metric ?
  delete            modify            new               show
```

1.3.3.7.1 Deleting a Metric Set

This command lets you delete a metric set. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> delete <tag>
```

1.3.3.7.2 Modifying a Metric Set

This command lets you modify a metric set. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> modify <tag> [-cost <cost>]
[-cbrcap <cbrcap>] [-vbrcap <vbrcap>]
```

1.3.3.7.3 Creating a Metric Set

This command lets you create a metric set that is used when creating a policy for a FT-PNNI static route. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> new <tag> [-cost <cost>]
[-cbrcap <cbrcap>][-vbrcap <vbrcap>]
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
tag	Indicates a unique integer that identifies this metric set.
-cost <cost>	The cost of reaching the address encompassed by this policy.
-cbrcap <cbrcap>	The CBR capacity of the link to reach the address encompassed by this policy.
-vbrcap <vbrcap>	The VBR capacity of the link to reach the address encompassed by this policy.

1.3.3.7.4 Displaying Metric Set Information

This command lets you display metric set information. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni metric> show
  Tag  Cost   CBRCAP   VBRCAP
  1    10     10       10
  Tag  Cost   CBRCAP   VBRCAP
  2    128     10       200
```

The fields in this display are defined as follows:

Field	Description
Tag	The unique integer number that identifies this metric set.
Cost	The cost of reaching the address encompassed by this policy.
CBRCAP	The CBR capacity of the link to reach the address encompassed by this policy.
VBRCAP	The VBR capacity of the link to reach the address encompassed by this policy.

You can also display information about a specific tag as follows:

```
myswitch::configuration atmroute ftpnni metric> show [<tag>]
myswitch::configuration atmroute ftpnni metric> show 2
  Tag  Cost   CBRCAP   VBRCAP
  2    128     10       200
```

If no metrics have been configured, then the following is displayed:

```
myswitch::configuration atmroute ftpnni metric> show
No metric information is available
```

1.3.3.8 Setting a Minimum Threshold for NSAP Updates

The minimum threshold is the smallest capacity value that the threshold value for determining the significant change in ACR can take. This minimum value ensures that the threshold value does not become a very small value in cases in which the product of the ACR and the proportional multiplier is a very small number. The minimum threshold is used to prevent excessively frequent NSAP updates resulting from minor changes in ACR when the value of ACR is very low. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> minthresh <minthresh>
```

This parameter is defined as follows:

Parameter	Description
minthresh	The minimum threshold bandwidth value for triggering NSAP updates. The default is 50 Kbps.

1.3.3.9 Setting the NSAP Indication Interval

NSAP indication messages are those messages that update topology information between any two switches. This command lets you set the interval between *ForeThought* PNNI NSAP indication messages. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> nsapindication <msec>
```

This parameter is defined as follows:

Parameter	Description
nsapindication	The period of time between transmissions of NSAP indication messages. The default is 10,000 microseconds.

1.3.3.10 Setting the *ForeThought* PNNI Peer Group Mask

A peer group mask is the length (in the number of bits) of the peer group ID of a switch. This command enables you to set the *ForeThought* PNNI peer group mask value. This value should be the same for all members of a peer group. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> pgmask <mask>
```

This parameter is defined as follows:

Parameter	Description
pgmask[1]	The mask that gives the number of leading bits in the switch prefix used to aggregate the addresses that belong to this *ForeThought* PNNI peer group. The default is 0.

1. The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

1.3.3.11 Selecting the Method for Computing the Cost of a Link

This command lets you select the method of computing the cost of a link from a border node to the peer group summary node (PGSN). Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> pgsncost (default | user -cost <cost>)
```

These parameters are defined as follows:

Parameter	Description
default	The border node automatically calculates the cost to the PGSN by taking half of the average cost from this node to all other border nodes in this peer group. This cost is dynamic.
user	The link to the PGSN from this border node will be advertised using the value that you specify with the `-cost` parameter.
-cost <cost>	Enter the administrative weight for the link that you want the border node to use during path computation. The route which takes the least cost is chosen. The default cost for all links in the network is `100`.

1.3.3.12 Setting the *ForeThought* PNNI Switch Prefix

When using *ForeThought* PNNI, a switch fabric is identified by an NSAP switch prefix which consists of 13 fixed bytes. The variable 13-byte mask configured using **conf atmroute ftpnni swmask** determines which bytes are actually significant. This command lets you set the *ForeThought* PNNI prefix on the switch. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> prefix <prefix>
```

This parameter is defined as follows:

Parameter	Description
prefix[1]	The FT-PNNI prefix for this ATM switch that is used in the hello indication FT-PNNI message.

1. The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

1.3.3.13 Setting the Proportional Multiplier

This command enables you to set the proportional multiplier for the NSAP router. The proportional multiplier is expressed as a percentage of Available Cell Rate (ACR) on any given link in the network. If the change in percentage of the ACR on any given link in the NSAP topology of the network exceeds this percentage threshold, then the change is considered significant. The topology tables are updated accordingly for that link. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> propmult <percentage>
```

This parameter is defined as follows:

Parameter	Description
propmult[1]	The threshold above which you consider the change in ACR on any link to be significant. The default is 20%.

1. If you modify this value, you should modify it on all switches in the network.

1.3.3.14 Static Route Configuration Commands

These commands let you create, delete, and display static routes. You can display the list of available subcommands by typing **?** at the **staticroute** level.

```
myswitch::configuration atmroute ftpnni staticroute> ?
  delete          new             show
```

1.3.3.14.1 Deleting a Static Route

This command enables you to remove an existing static route. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni staticroute> delete <NSAP> <mask> <port> <vpi>
```

1.3.3.14.2 Creating a Static Route

This command allows you to create a static route. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni staticroute> new <NSAP> <mask> <port> <vpi>
[-cost <cost>][-cbr_cap <cbr_cap>] [-vbr_cap <vbr_cap>] [abr] [epd]
```

The following is an example of how to create an NSAP static route:

```
myswitch::configuration atmroute ftpnni staticroute> new
0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00 152 1c2 0 -cost 200 -cbr_cap 20000
-vbr_cap 30000 abr
```

The parameters for delete and new are defined as follows:

Parameter	Description
NSAP	The complete 20-byte NSAP route address in hexadecimal format.
mask	The bit mask indicating number of high-order bits to use for routing purposes. The default mask for the route to the host is 152 and the default mask for the route to the switch is 104.
port	The port number through which this static route can be reached.
vpi	The UNI signalling path through which this static route can be reached.
-cost <cost>	Used only with the **new** command. The routing metric for this link. There is a cost for each link in a route. The sum of these link costs determines the overall cost of a route. To expedite traffic on a route, try to minimize the overall cost of a route. For a critical route, then, choose a small cost value. For a lesser important route, choose a higher cost value.
-cbr_cap <cbr_cap>	Used only with the **new** command. The maximum CBR (Constant Bit Rate) capacity allowed for any single connection on this route. This number is limited by the actual CBR capacity available on the output link specified for this route.
-vbr_cap <vbr_cap>	Used only with the **new** command. The maximum VBR (Variable Bit Rate) capacity allowed for any single connection on this route. This number is limited by the actual VBR capacity available on the output link specified for this route.
abr	Used only with the **new** command. Use the `abr` parameter only for links that support ABR traffic.
epd	Used only with the **new** command. Use the `epd` parameter only for links that support Early Packet Discard.

1.3.3.14.3 Displaying Static Routes

This command lets you display the current static routes. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni staticroute> show
NSAP-address                              Mask Port VPI Cost CBR   VBR   FLAGS
                                                            Mbs   Mbs
47000580ffe1000000f21511f200204810046400 152  1C2  0   200  20.0  30.0  A
47000580ffe1000000f21511f20020481ee00000 144  1C3  0   100  70.0  60.0  AE
47000580ffe1000000f21511f20020481ff00000 144  1C1  0   100  INF   INF   AE
47000580ffe1000000f21511f20020481ff12300 152  1C3  0   100  INF   INF
```

The fields in this display are defined as follows:

Field	Description
NSAP-address	Shows the 20-byte address for which the static route is configured.
Mask	The bit mask indicating number of high-order bits to use for routing purposes. The default mask for a static route to a host is `152` and the default mask for a static route to another switch is `104`.
Port	The port number on which the NSAP route exists.
VPI	The number of the virtual path on which the NSAP static route exists.
Cost	The routing metric for this link. There is a cost for each link in a route. The sum of these costs determines the overall cost of a route. To expedite traffic on a route, try to minimize the overall cost of a route. A small cost value is assigned to a critical route, while a higher cost value is assigned to a lesser important route. The default is `100`.
CBR	The maximum CBR capacity allowed for any single connection on this route. `INF` means that you did not specify a value for this parameter when the route was created, so the value defaults to the capacity available on the outgoing link.
VBR	The maximum VBR capacity allowed for any single connection on this route. `INF` means that you did not specify a value for this parameter when the route was created, so the value defaults to the capacity available on the outgoing link.
FLAGS	`A` means this link supports ABR traffic. `E` means that this route supports Early Packet Discard (EPD). `AE` means this link supports both ABR traffic and EPD. No flags indicate that neither EPD nor ABR traffic are supported on this link.

If you have not configured any static routes, then the following message is displayed:

```
myswitch::configuration atmroute ftpnni staticroute> show
No NSAP static route information is available
```

1.3.3.15 Setting the *ForeThought* PNNI Switch Prefix Mask

This command allows you to select the *ForeThought* PNNI switch prefix mask value. Enter the following parameters:

```
myswitch::configuration atmroute ftpnni> swmask <mask>
```

This parameter is defined as follows:

Parameter	Description
swmask[1]	The mask that gives the number of leading bits in the switch prefix used to aggregate the addresses that belong to the switch in *ForeThought* PNNI. The default is 104.

1. The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

1.3.3.16 Setting a Minimum Virtual Channel Mark

When the number of available virtual channels on a path drops to zero, a link state update is sent out to advertise that there are no more VCs available for use on this path. When the number of VCs indicated by the **vcmark** is available for use on this path again, another link state update is sent out to advertise that there are VCs available for use on this path once again. This command lets you set the **vcmark**, which is the minimum number of virtual channels that need to be to available on a path to make that path usable again. Enter the following:

```
myswitch::configuration atmroute ftpnni> vcmark <vcmark>
```

This parameter is defined as follows:

Parameter	Description
vcmark	The minimum number of virtual channels that need to be available on a path to make that path usable. The default is 20.

1.3.3.17 Displaying *ForeThought* PNNI Parameters

This command lets you display all of the *ForeThought* PNNI topology parameters. Enter the following:

```
myswitch::configuration atmroute ftpnni> show

Switch NSAP prefix                      0x47.0005.80.ffe100.0000.f21c.078e
Switch Prefix Mask                      104
Peer Group Mask                         0

Hello Indication Interval               500 msec
NSAP Indication Interval                10000 msec
Max hop count for NSAP router           20 hops
Proportional Multiplier                 20 %
Minumum Threshold for NSAP updates      50 Kbps
Minimum VC level                        20
Fore Area                               4
Fore Level                              4
Cost of link to PGSN                    100
Cost of link to PGSN computing method   default

FORE PNNI border switch functionality is enabled
```

The fields in this display are defined as follows:

Field	Description
Switch NSAP prefix	The switch's NSAP prefix.
Switch Prefix Mask	The switch prefix mask value of high-order bits to use for aggregating addresses on the switch for routing purposes.
Peer Group Mask	The peer group mask value of high-order bits to use for aggregating addresses on the switch for routing purposes.
Hello Indication Interval	The period of time between transmissions of hello indication messages.
NSAP Indication Interval	The period of time between transmissions of NSAP indication messages.
Max hop count for NSAP router	The maximum number of hops to use when routing a connection for the NSAP router.
Proportional Multiplier	The threshold above which the change in ACR on any link is considered to be significant.
Minimum Threshold for NSAP updates	The minimum threshold bandwidth value for triggering NSAP updates.
Minimum VC level	The minimum number of VCs that need to be available on a path to make that path usable again after the number of available VCs has dropped to 0.

Field	Description
Fore Area	The ID of the area in the FORE hierarchy to which this *ForeThought* PNNI node belongs.
Fore Level	The level of the area to which this *ForeThought* PNNI node belongs in the FORE hierarchy.
Cost of Link to PGSN	The administrative weight for the link that the border node uses during path computation to the PGSN. The route which takes the least cost is chosen. This field is displayed on border switches only.
Cost of Link to PGSN computing method	The method used for computing the link cost from the border switch to the PGSN. This field is displayed on border switches only. Can be `default` or `user`.
FORE PNNI border switch functionality is disabled	If this functionality is `enabled`, this switch acts as a *ForeThought* PNNI border switch. If this functionality is `disabled`, this switch does not act as a *ForeThought* PNNI border switch.

1.3.4 ATM Forum PNNI Configuration Commands

These commands allow you to configure ATM Forum PNNI on a switch. You can display the list of available subcommands by typing **?** at the **pnni** level.

```
myswitch::configuration atmroute pnni> ?
  address>          crankback>        interface>        metric>
  node>             profile>
```


1.3.4.1 PNNI Address Configuration Commands

These commands allow you to configure ATM Forum PNNI exterior reachability addresses. You can display the list of available subcommands by typing **?** at the **address** level.

```
myswitch::configuration atmroute pnni address> ?
  delete            modify            new               show
```

1.3.4.1.1 Deleting a PNNI Exterior Reachability Address

This command deletes the PNNI exterior reachability addresses and static routes between two domains called interdomain routes. Enter the following parameters:

myswitch::configuration atmroute pnni address> **delete pnni** *<nodeix> <address> <len> <index>* OR/**interdomain** *<domain_id> <address> <len> <dest_domain_id>*

1.3.4.1.2 Modifying a PNNI Exterior Reachability Address

This command lets you modify the PNNI exterior reachability address between two domains. Enter the following parameters:

myswitch::configuration atmroute pnni address> **modify** *<nodeix> <address> <len> <index>* [**-port** *<port>* **-vpi** *<vpi>*] [**-mtag** *<mtag>*]

1.3.4.1.3 Creating a PNNI Exterior Reachability Address

This command lets you create a PNNI exterior reachability address between two domains so they can share reachability information. Enter the following parameters:

myswitch::configuration atmroute pnni address> **new pnni** *<nodeix> <address> <len> <index>*
-port *<port>* **-vpi** *<vpi>* [**-mtag** *<mtag>*] OR
new interdomain *<domain_id> <address> <len> <dest_domain_id>*

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
nodeix	The index number of the source node for which a static route is being configured.
address	The source address prefix (19 bytes long).
len	The number of significant bits in the source address prefix.
index	The index number for this static route. This is used in combination with address and len. More than one static route can be configured on a given port with the same address and len values, as long as the index numbers are different.
-port <port>	The number of the port to which the static route is attached.
-vpi <vpi>	The virtual path number to which the static route is attached.
-mtag <mtag>	The metrics tag from the **`conf pnni metric`** menu that is associated with this static route.
domain_id	The domain identifier of this domain (the domain from which the static route is originating).
address	The destination address prefix (19 bytes long).
len	The number of significant bits in the destination address prefix.
dest_domain_id	The domain identifier of the destination domain.

1.3.4.1.4 Displaying PNNI Exterior Reachability Address Information

This command lets you display information about any statically configured reachability addresses between this domain and other domains. These routes allow two directly connected domains to share reachability information. Enter the following parameters:

```
myswitch::configuration atmroute pnni address> show
PNNI Route Addr Information:
 Node Address                                    Plen Index
 1    47.000580ffe1000000f21a0141.000000000000 104  1
      Port VPI Type     Proto Scope VPcap Mtag OperStatus
      1C1  0   exterior mgmt  0     false 0    advertised
ATMR Inter-Domain Route Information:
 Domain Address                                    Plen Destn
 1      47.000580ffe1000000f21a0140.002048aabbcc 104  2
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of the node for which the static route is being displayed.
Address	The source address prefix (19 bytes long).
Plen	The number of significant bits in the source address prefix.
Index	The index number for this static route, used in combination with Address and Plen. More than one static route can be configured on a given port with the same Address and Plen values, as long as the index numbers are different.
Port	The number of the port to which the static route is attached.
VPI	The virtual path number to which the static route is attached.
Type	Shows what type of reachability address this is, based on what was configured in the **conf atmr policy** menu. This field is read-only.
Proto	**mgmt** means that the addresses displayed are those addresses that are configured via AMI (configured from SNMP). This field is read-only.
Scope	Shows the scope, which is the highest level at which this reachability information can be advertised. If the address has a scope indicating a level lower than the level of the node, the node will not advertise it. If the address has a scope indicating a level higher than or equal to the level of the node, the node will advertise it to its peer group. The default is 0, which means that the address will be advertised to all levels. This field is read-only.
VPcap	`true` means that this interface has VP switching capability and `false` means that it does not. This field is read-only and set to false.
Mtag	The metrics tag from the **conf pnni metric** submenu that is associated with this static route. This field is read-only.

Field	Description
OperStatus	Shows if just the summarized prefix of this address will be announced to the node's peer group, if the entire address will be advertised to the node's peer group, or if this address will not be announced to the node's peer group at all. This field is read-only.
Domain	The domain identifier of this domain (the domain from which the static route is originating).
Address	The destination address prefix (19 bytes long).
Plen	The number of significant bits in the destination address prefix.
Destn	The domain identifier of the destination domain.

You can also display just certain portions of the reachability information. Enter the following parameters:

```
myswitch::configuration atmroute pnni> address show [(pnni | interdomain) [<nodeix>
[<address> [<len> [<index>]]]]]
```

If no PNNI addresses have been configured, then the following is displayed:

```
myswitch::configuration atmroute pnni address> show
No route address information is available
No Inter Domain Route information available
```

1.3.4.2 PNNI Crankback Configuration Commands

These commands let you configure crankback on a switch. During PNNI signalling, a call being processed according to a DTL may encounter a blocked node or link along the designated route. Crankback allows a partial reroute of such a rejected call so that it does not have to be cleared all the way back to the source. Additionally, an indication of the blockage is sent to the originator of the DTL. You can display the list of available subcommands by typing **?** at the **crankback** level.

```
myswitch::configuration atmroute pnni crankback> ?
  show            set
```


1.3.4.2.1 Displaying the Crankback Setting

This command lets you display the number of times a PNNI call is attempted through crankback on this switch before it is rejected. Enter the following parameters:

```
myswitch::configuration atmroute pnni crankback> show
 Number of tries per call : 2
```

The field in this display is defined as follows:

Parameter	Description
Number of tries per call	The total number of times a PNNI call is attempted and retried through crankback before it is rejected. The default is 2.

1.3.4.2.2 Configuring the Crankback Setting

This command lets you set the number of times a PNNI call will be retried through crankback on this switch before it is rejected. Enter the following parameters:

```
myswitch::configuration atmroute pnni crankback> set <tries>
```

This parameter is defined as follows:

Parameter	Description
tries	The total number of times a PNNI call is attempted and retried through crankback before it is rejected. The default is 2.

1.3.4.3 PNNI Interface Configuration Commands

An ATM Forum PNNI node can be bound to a given network-to-network interface (NNI). This is useful when configuring more than one node on a switch. By default, there is one node on a switch configured with the *ForeThought* PNNI protocol and this node is bound to all existing NNIs. The default NNI routing protocol of the default domain dictates the PNNI interface type. You can display the list of available subcommands by typing **?** at the **interface** level.

```
myswitch::configuration atmroute pnni interface> ?
  modify           show
```

1.3.4.3.1 Modifying a PNNI Interface

This command lets you modify a PNNI interface. Enter the following parameters:

```
myswitch::configuration atmroute pnni interface> modify <port> <vpi>
                [-nodeix <nodeix>]
                [-aggrtoken <aggrtoken>]
                [-cbrw <cbrw>]
                [-rtvbrw <rtvbrw>]
                [-nrtvbrw <nrtvbrw>]
                [-abrw <abrw>]
                [-ubrw <ubrw>]
```

The parameters for modify are defined as follows:

Parameter	Description
port	The port number of the interface to be modified.
vpi	The virtual path number of the interface to be modified.
-nodeix <nodeix>	The index of the node to which the interface is attached.
-aggrtoken <aggrtoken>	The link aggregation token value that is advertised in the Hello protocol. Currently, this parameter is not supported.
-cbrw <cbrw>	The administrative weight of this interface for CBR traffic.
-rtvbrw <rtvbrw>	The administrative weight of this interface for real-time VBR traffic.
-nrtvbrw <nrtvbrw>	The administrative weight of this interface for non real-time VBR traffic.
-abrw <abrw>	The administrative weight of this interface for ABR traffic.
-ubrw <ubrw>	The administrative weight of this interface for UBR traffic.

1.3.4.3.2 Displaying a PNNI Interface

This command lets you display information about the PNNI interfaces. Enter the following parameters:

```
myswitch::configuration atmroute pnni interface> show
 Port VPI  Node PortID     AggrT VPCap CbrW    RtVbrW  NrtVbrW AbrW    UbrW
 1A1  0    N/A  0x10000000 0     false 5040    5040    5040    5040    5040
 1A2  0    N/A  0x10000001 0     false 5040    5040    5040    5040    5040
 1A3  0    N/A  0x10000002 0     false 5040    5040    5040    5040    5040
 1A4  0    1    0x10000003 0     false 5040    5040    5040    5040    5040
 1A5  0    1    0x10000004 0     false 5040    5040    5040    5040    5040
 1A6  0    1    0x10000005 0     false 5040    5040    5040    5040    5040
 1CTL 0    N/A  0x10000038 0     false 5040    5040    5040    5040    5040
```


The fields in this display are defined as follows:

Field	Description
Port	The port number of the interface.
VPI	The virtual path number of the interface.
Node	The index of the node to which the interface is attached.
PortID	The internal representation of this port used by ATM Forum PNNI.
AggrT	The link aggregation token value that is advertised in the Hello protocol. This field is read-only and set to 0.
VPCap	`true` means that this interface has VP switching capability and `false` means that it does not. This field is read-only and set to false.
CbrW	The administrative weight of this interface for CBR traffic. The default is 5040.
RtVbrW	The administrative weight of this interface for real-time VBR traffic. The default is 5040.
NrtVbrW	The administrative weight of this interface for non real-time VBR traffic. The default is 5040.
AbrW	The administrative weight of this interface for ABR traffic. The default is 5040.
UbrW	The administrative weight of this interface for UBR traffic. The default is 5040.

You can also display the PNNI interface of a specific port or specific port and vpi as follows:

```
myswitch::configuration atmroute pnni> interface show [<port> <vpi>]
myswitch::configuration atmroute pnni> interface show 1a2 0
 Port VPI  Node PortID     AggrT VPCap CbrW    RtVbrW  NrtVbrW AbrW    UbrW
 1A2  0    N/A  0x10000001 0     false 5040    5040    5040    5040    5040
```

The fields in this display are defined in the same manner as those in the previous example.

1.3.4.4 PNNI Metric Configuration Commands

These commands allow you to configure PNNI metric sets. You can display the list of available subcommands by typing **?** at the **metric** level.

```
myswitch::configuration atmroute pnni metric> ?
  delete           modify           new              show
```

1.3.4.4.1 Deleting a Metric Set

This command lets you delete a metric set. Enter the following parameters:

```
myswitch::conf atmroute pnni metric> delete <nodeix> <tag> (incoming | outgoing) <index>
```

1.3.4.4.2 Modifying a Metric Set

This command lets you modify a metric set. Enter the following parameters:

```
myswitch::config atmroute pnni metric> modify <nodeix> <tag> (incoming|outgoing) <index>
        [cbr] [rtvbr] [nrtvbr] [abr] [ubr] [clpEqual0|clpEqual0Or1]
        [-adminw <adminw>] [-pcr <pcr>] [-acr <acr>]
        [-ctd <ctd>] [-cdv <cdv>] [-clr <clr>]
        [-clr1 <clr1>] [-crm <crm>] [-vf <vf>]
```

1.3.4.4.3 Creating a Metric Set

This command lets you create a metric set. Enter the following parameters:

```
myswitch::configur atmroute pnni metric> new <nodeix> <tag> (incoming|outgoing) <index>
        [cbr] [rtvbr] [nrtvbr] [abr] [ubr] [clpEqual0|clpEqual0Or1]
        [-adminw <adminw>] [-pcr <pcr>] [-acr <acr>]
        [-ctd <ctd>] [-cdv <cdv>] [-clr <clr>]
        [-clr1 <clr1>] [-crm <crm>] [-vf <vf>]
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
nodeix	The index number of the node to which this metric set belongs.
tag	Indicates an arbitrary integer that identifies this metric set.
incoming | outgoing	The direction of the metric set with respect to the owning node.
index	The index number of the metrics being configured within the metric set.
cbr	Indicates that the metric applies to CBR traffic.
rtvbr	Indicates the metric applies to real-time VBR traffic.
nrtvbr	Indicates the metric applies to non real-time VBR traffic.
abr	Indicates that the metric applies to ABR traffic.
ubr	Indicates that the metric applies to UBR traffic.
clpEqual0	Indicates that the advertised GCAC parameters apply to CLP = 0 traffic.
clpEqual0Or1	Indicates that the advertised GCAC parameters apply to CLP = 0+1 traffic.
-adminw <adminw>	The administrative weight value.
-pcr <pcr>	The peak cell rate.
-acr <acr>	The available cell rate.
-ctd <ctd>	The cell transit delay.
-cdv <cdv>	The cell delay variation.
-clr <clr>	The cell loss ratio for CLP=0 traffic.
-clr1 <clr1>	The cell loss ratio for CLP=0+1 traffic.
-crm <crm>	The cell rate margin.
-vf <vf>	The variance factor.

1.3.4.4.4 Displaying Metric Set Information

This command lets you display metric set information. Enter the following parameters:

```
myswitch::configuration atmroute pnni metric> show
 Node Tag  Direction  Index Cbr   RtVbr NrtVbr Abr   Ubr   ClpType      Adminw
 1    1    incoming   1     false false false  false false clpEqual0    5040
           PCR             ACR             CTD(usec)       CDV(usec)
           4294967295      4294967295      4294967295      4294967295
           CLR             CLR1            CRM             VF
           4294967295      4294967295      4294967295      4294967295
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of the node to which the metric set belongs.
Tag	The integer that identifies this metric set.
Direction	The direction of the metric set with respect to the owning node. Can be either `incoming` or `outgoing`.
Index	The index number of the RAIG being configured within the metric set.
Cbr | RtVbr | NrtVbr | Abr | Ubr	`true` means that the RAIG applies to this type of traffic. `false` means that it does not.
ClpType	`clpEqual0` means that the advertised GCAC parameters apply to CLP = 0 traffic. `clpEqual0Or1` means that the advertised GCAC parameters apply to CLP = 0+1 traffic.
Adminw	The administrative weight.
PCR	The peak cell rate.
ACR	The available cell rate.
CTD	The cell transit delay.
CDV	The cell delay variation.
CLR	The cell loss ratio for CLP=0 traffic.
CLR1	The cell loss ratio for CLP=0+1 traffic.
CRM	The cell rate margin.
VF	The variance factor.

You can also display information about a specific node, tag, direction, or index as follows:

```
myswitch::configuration atmroute pnni metric> show [<nodeix>] [<tag>]
[(incoming|outgoing)] [<index>]
myswitch::configuration atmroute pnni metric> show 1 1
 Node Tag  Direction  Index Cbr   RtVbr NrtVbr Abr   Ubr   ClpType      Adminw
 1    1    incoming   1     false false false  false false clpEqual0    5040
           PCR             ACR             CTD(usec)       CDV(usec)
           4294967295      4294967295      4294967295      4294967295
           CLR             CLR1            CRM             VF
           4294967295      4294967295      4294967295      4294967295
```

If no metrics have been configured, then the following is displayed:

```
myswitch::configuration atmroute pnni metric> show
No metric information is available
```

1.3.4.5 PNNI Node Configuration Commands

These commands allow you to configure PNNI nodes. You can display the list of available subcommands by typing **?** at the **node** level.

```
myswitch::configuration atmroute pnni node> ?
  admin            delete           new              modify
  show
```

1.3.4.5.1 Configuring the PNNI Node State

This command lets you bring an existing PNNI node up or take it down. You must administer a node down before you can modify it. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> admin <index> (up | down)
```

1.3.4.5.2 Deleting a PNNI Node

This command lets you delete an existing PNNI node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> delete <index>
```

When you delete a node, the switch prompts you with a warning and asks if you really want to delete the node as follows:

```
myswitch::configuration atmroute pnni node> delete 2

Deleting a node will delete all addresses, metrics, profiles, policies
and other information configured for this node. PNNI interfaces currently
attached to this node will be re-attached to any remaining node within
the same domain. If there are no remaining nodes, the interfaces will
display N/A in the 'Node' column until a new node is created in this
domain.

Are you sure you want to delete node [n]? y
```

Entering **n** or pressing <**ENTER**> aborts the command. Entering **y** deletes the node.

1.3.4.5.3 Creating a PNNI Node

This command lets you create a PNNI node.

The maximum number of nodes that can be created per switch is 2. There can be 2 PNNI nodes or one FT-PNNI node and one PNNI node.

Enter the following parameters:

```
myswitch::configuration atmroute pnni node> new <index>
                [-level <level>]
                [-nodeid <nodeid>]
                [-pgid <pgid>]
                [-atmaddr <atmaddr>]
                [-admin (up|down)]
                [-domainname <domainname>]
                [-restrict (true|false)]
                [-ptsehd <ptsehd>]
                [-hellohd <hellohd>] [-hello <hello>]
                [-helloinactf <helloinactf>]
                [-hlinkinact <hlinkinact>]
                [-ptserfr <ptserfr>]
                [-ptselftf <ptselftf>]
                [-rxmt <rxmt>]
                [-avcrpm <avcrpm>] [-avcrmt <avcrmt>]
                [-cdvpm <cdvpm>] [-ctdpm <ctdpm>]
                [-domain <domain>]
                [-forelevel <level>] [-forearea <area>]
```

1.3.4.5.4 Modifying a PNNI Node

This command lets you modify a PNNI node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> modify <index>
                [-level <level>]
                [-nodeid <nodeid>]
                [-pgid <pgid>]
                [-atmaddr <atmaddr>]
                [-admin (up|down)]
                [-domainname <domainname>]
                [-restrict (true|false)]
                [-ptsehd <ptsehd>]
                [-hellohd <hellohd>] [-hello <hello>]
                [-helloinactf <helloinactf>]
                [-hlinkinact <hlinkinact>]
                [-ptserfr <ptserfr>]
                [-ptselftf <ptselftf>]
                [-rxmt <rxmt>]
                [-avcrpm <avcrpm>] [-avcrmt <avcrmt>]
                [-cdvpm <cdvpm>] [-ctdpm <ctdpm>]
                [-domain <domain>]
                [-forelevel <level>] [-forearea <area>]
```

If you want to modify **-level**, **-nodeid**, **-pgid**, **-atmaddr**, **-domain**, **-forelevel**, or **-forearea**, you must first administer the node down using **-admin down**.

The parameters for admin, delete, new and modify are defined as follows:

Parameter	Description
index	The index number of the node.
admin	The administrative status of the node. **up** means the node is active. **down** means the node is inactive.
-level <level>	The PNNI hierarchy level of this node. The default is 80.
-nodeid <nodeid>	The ID of this node.
-pgid <pgid>	The peer group ID of the peer group to which this nodes belongs.
-atmaddr <atmaddr>	This node's ATM end system address.

Parameter	Description
-domainname <domainname>	The name of the domain to which this node belongs.
-restrict (true | false)	Indicates whether or not the originating node is restricted only to allow support of SVCs originating or terminating at this node. **true** means that transit capabilities are restricted (i.e., transit connections are not allowed) and **false** means that transit connections are allowed. The default is **false**.
-ptsehd <ptsehd>	The PTSE hold down time, or the minimum interval between updates of any given PTSE. The default is 10 seconds.
-hellohd <hellohd>	The hello hold down time, or the minimum interval between successive hello message transmissions. The default is 10 seconds.
-hello <hello>	The period of time between transmissions of hello messages (“keep alive” messages that two nodes send to one another to verify their existence), in the absence of event-triggered hellos. The default is 15 seconds.
-helloinactf <helloinactf>	The number of hello intervals allowed to pass without receiving a hello message, before a link is declared down. The default is 5 counts.
-hlinkinact <hlinkinact>	The amount of time that a node continues to advertise a horizontal link for which it has not received and processed the logical group node (LGN) horizontal link IG. The default is 120 seconds.
-ptserfr <ptserfr>	The interval between two successive refreshes of a self-originated PTSE in the absence of triggered updates. A node re-originates its PNNI Topology State Elements (PTSEs) at this rate to prevent other nodes from flushing these PTSEs. The default is 1800 seconds.
-ptselftf <ptselftf>	The value used to calculate the initial lifetime of self-originated PTSEs. The initial lifetime is set to the product of the PTSE refresh interval and the PTSE Lifetime Factor. The default is 200%.
-rxmt <rxmt>	The interval at which unacknowledged PTSEs are retransmitted. A PTSE is retransmitted every interval unless explicitly acknowledged through the receipt of either an acknowledgment packet specifying the PTSE instance, or the same instance or a more recent instance of the PTSE by flooding. The default is 5 seconds.
-avcrpm <avcrpm>	The proportional multiplier is expressed as a percentage of the last advertised Available Cell Rate (ACR) on any given PNNI link in the network. If the change in percentage of the ACR on any given PNNI link in the NSAP topology of the network exceeds this percentage threshold, then the change is considered significant and the topology tables are updated accordingly for that link. This value indicates the threshold above which you consider the change in Available Cell Rate (ACR) on any PNNI link to be significant. The default is 50%. The range is 1-99%.
-acvrmt <acvrmt>	The minimum threshold is the smallest capacity value that the threshold value for determining the significant change in ACR can take. This minimum value ensures that the threshold value does not become a very small value in cases in which the product of the ACR and the proportional multiplier is a very small number. The minimum threshold prevents excessively frequent NSAP updates resulting from minor changes in ACR when the value of ACR is very low. This value indicates the minimum threshold above which you consider the change in Available Cell Rate (ACR) on any PNNI link to be significant. The default is 3%. The range is 1-99%.

Parameter	Description
-cdvpm <cdvpm>	Indicates the threshold above which you consider the change in Cell Delay Variation (CDV) on any PNNI link to be significant. The default is 25%. The range is 1-99%.
-ctdpm <ctdpm>	Indicates the threshold above which you consider the change in Cell Transit Delay (CTD) on any PNNI link to be significant. The range is 1-99%.
-domain <domain>	The index number of the domain to which this node belongs.
-forelevel <level>	The level of the area used in FORE's hierarchy support. This can be a value between 1 and 127. The default is 5.
-forearea <area>	The ID of the area in FORE's hierarchy support to which this node belongs. This can be a value between 1 and 127. The default is 5.

1.3.4.5.5 Displaying PNNI Node Information

This command lets you display PNNI node information. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> show
 Node PnniNodeID                                          Level Lowest Rstrn
 1    80:160:47.000580ffe1000000f21a3509.ff1a35090001.00  80    true   false
      PeerGroupID                    PnniAtmAddress
     80:47.000580ffe1000000f2000000 47.000580ffe1000000f21a3509.ff1a35090001.00
      Ptses OperStat AdminStat Shutdown ForeLevel ForeArea DomainId  DomainName
      60    up       up        false    5         5        1
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of this node.
PnniNodeID	The peer group identifier of the peer group to which this node belongs.
Level	The PNNI hierarchy level of the node.
Lowest	`True` means that this node is a lowest level node. This is a read-only field.
Rstrn	Shows whether or not this is a restricted transit node. `true` means that it is and `false` means that it is not.
PeerGroupID	The peer group ID of the peer group to which this node belongs.
PnniAtmAddress	The node's ATM end system address.
Ptses	The number of PTSEs that belong to this node (i.e., the number of PTSEs that are present in this node's database).
OperStat	The current status of this node. `Up` means the node is currently active. `Down` means the node is currently inactive.

Field	Description
AdminStat[1]	Reflects any changes that you have made to the status of the node. `Up` means you want the node to become active. `Down` means you want the node to become inactive so you can modify one or more of the parameters.
Shutdown	On a rare occasion, the topology database (TDB) can get into an unrecoverable error state which causes the PNNI logical node to shut down. If this happens, the `OperStat` field is set to `down`, the `Shutdown` field is set to `true`, and an error message is sent to the console. Then the node quits participating in PNNI activities, such as sending hello packets, performing the database exchange, performing path computation, etc. Other AMI **`conf atmr pnni node`** commands such as **`admin`**, **`modify`**, and **`delete`** are disabled. Other AMI commands under **`display atmr pnni`** are disabled (except for **`link`** and **`peer`**) and **`debug dump atmr pnni tdb`** is disabled. To clear the condition and bring the node up again, you must reboot the switch. The default value is `false`.
ForeLevel	The level of the area to which this PNNI node belongs in the FORE hierarchy. The default is 5.
ForeArea	The ID of the area in the FORE hierarchy to which this PNNI node belongs. The default is 5.
DomainId	The index number of the domain to which this node belongs. The default is 1.
DomainName	The name of the domain to which this node belongs, if one has been assigned.

1. When you change the administrative status from `down` to `up`, it takes a few seconds for the operational change to occur and to be reflected in the `OperStat` field. Therefore, it is possible for the display to show the `AdminStat` as `up`, but the `OperStat` as `down`. If you refresh the display after two or three seconds, the change will have taken place and be reflected.

You can also display timer information, information about significant changes, or information about a specific node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> show [timer | sigchange] [<nodeix>]
```

To display timer information, enter the following parameters:

```
myswitch::configuration atmroute pnni node> show timer
 Node PtseHD     HelloHD    Hello HelloInactF HLinkInact PtseRfr PtseLftF Rxmt
      (100 msec) (100 msec) (sec)             (sec)      (sec)            (sec)
 1    10         10         15    5           120        1800    200%     5
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of this node.
PtseHD	The minimum interval, in microseconds, between updates of any given PTSE.
HelloHD	The minimum interval, in microseconds, between successive hello message transmissions.
Hello	The period of time, in seconds, between transmissions of hello, or “keep-alive” messages, in the absence of event-triggered hellos.
HelloInactF	The number of hello intervals allowed to pass without receiving a hello message, before a link is declared down.
HLinkInact	The amount of time, in seconds, that a node continues to advertise a horizontal link for which it has not received and processed the logical group node (LGN) horizontal link IG.
PtseRfr	The interval, in seconds, between re-originations of a self-originated PTSE in the absence of triggered updates. A node re-originates its PNNI Topology State Elements (PTSEs) at this rate to prevent other nodes from flushing these PTSEs.
PtseLftF	The value used to calculate the initial lifetime of self-originated PTSEs. The initial lifetime is set to the product of the PTSE refresh interval and the PTSE Lifetime Factor.
Rxmt	The interval, in seconds, at which unacknowledged PTSEs are retransmitted. A PTSE is retransmitted every interval unless explicitly acknowledged through the receipt of either an acknowledgment packet specifying the PTSE instance, or the same instance or a more recent instance of the PTSE by flooding.

To display information about significant changes, enter the following parameters:

```
myswitch::configuration atmroute pnni node> show sigchange
 Node AvcrPm AvcrMt CdvPm  CtdPm
 1    50%    5%     25%    50%
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of this node.
AvcrPm	A change in the Available Cell Rate by this percentage is considered to be significant, provided the change is more than the threshold value specified using AvcrMt.
AvcrMt	The minimum threshold for change in Available Cell Rate after which AvcrPm is used to find the significant change. AvcrMt is expressed as a percentage in Maximum Cell Rate.
CdvPm	A change in Cell Delay Variation by this percentage is considered to be significant.
CtdPm	A change in Maximum Cell Transfer Delay by this percentage is considered to be significant.

NOTE

A significant change in any of the above parameters will result in a re-origination of the PTSE.

You can also display information about a specific node. Enter the following parameters:

```
myswitch::configuration atmroute pnni node> show 1
 Node PnniNodeID                                          Level Lowest Rstrn
 1    80:160:47.000580ffe1000000f21a3509.ff1a35090001.00  80    true   false
      PeerGroupID                   PnniAtmAddress
     80:47.000580ffe1000000f2000000 47.000580ffe1000000f21a3509.ff1a35090001.00
      Ptses OperStat AdminStat Shutdown ForeLevel ForeArea DomainId  DomainName
      60    up       up        false    5         5        1
```

The fields in this display are defined in the same manner as those listed previously.

1.3.4.6 PNNI Profile Configuration Commands

These commands allow you to configure PNNI path computation profiles. You can display the list of available subcommands by typing **?** at the **profile** level.

```
myswitch::configuration atmroute pnni profile> ?
  delete           modify           new              show
```

1.3.4.6.1 Deleting a PNNI Profile

This command lets you delete an existing PNNI path computation profile. Enter the following parameters:

```
myswitch::configuration atmroute pnni profile> delete <nodeix> <profileix>
```

1.3.4.6.2 Modifying a PNNI Profile

This command lets you modify an existing PNNI path computation profile. Enter the following parameters:

```
myswitch::configuration atmroute pnni profile> modify <nodeix> <profileix>
                [-minfwdcr <minfwdcr>] [-minrevcr <minrevcr>]
                [-fwdclptype (clpEqual0|clpEqual0Or1)]
                [-revclptype (clpEqual0|clpEqual0Or1)]
                [-fwdclr <fwdclr>] [-revclr <revclr>] [-optctd (true|false)]
                [-optcdv (true|false)] [-loadbal (true|false)]
                [-vponly (true|false)]
```

1.3.4.6.3 Creating a PNNI Profile

This command lets you create a PNNI path computation profile. Enter the following parameters:

```
myswitch::configuration atmroute pnni profile> new <nodeix> <profileix>/
                    (cbr|rtVbr|nrtVbr|abr|ubr)
                    [-minfwdcr <minfwdcr>] [-minrevcr <minrevcr>]
                    [-fwdclptype (clpEqual0|clpEqual0Or1)]
                    [-revclptype (clpEqual0|clpEqual0Or1)]
                    [-fwdclr <fwdclr>] [-revclr <revclr>] [-optctd (true|false)]
                    [-optcdv (true|false)] [-loadbal (true|false)]
                    [-vponly (true|false)]
```

The parameters for delete, new, and modify are defined as follows:

Parameter	Description
nodeix	The index number of the node to which the profile belongs.
profileix	The index number of the profile.
cbr | rtVbr | nrtVbr | abr | ubr	Used only with the **new** command. Indicates for which class of service this profile is used: either cbr, rtVbr, nrtVbr, abr, or ubr.
-minfwdcr <minfwdcr>	The minimum forward cell rate requirement.
-minrevcr <minrevcr>	The minimum reverse cell rate requirement.
-fwdclptype (clpEqual0 | clpEqual0Or1)	**clpEqual0** means the requested CLR constraint in the forward direction is for the CLP0 stream. **clpEqual0OR1** means the requested CLR constraint in the forward direction is for CLP0+1 stream.
-revclptype (clpEqual0 | clpEqual0Or1)	**clpEqual0** means the requested CLR constraint in the reverse direction is for the CLP0 stream. **clpEqual0OR1** means the requested CLR constraint in the reverse direction is for CLP0+1 stream.
-fwdclr <fwdclr>	The forward CLR. Applies only to CBR and VBR class of service.
-revclr <revclr>	The reverse CLR. Applies only to CBR and VBR class of service.
-optctd (true | false)	**true** means that the profile is to optimize on CTD and **false** means that it is not. Applies only to CBR and VBR class of service.
-optcdv (true | false)	**true** means that the profile is to optimize on Cell Delay Variation (CDV) and **false** means that it is not. Applies only to CBR and VBR class of service.
-loadbal (true | false)	**true** means that load balancing is activated for the profile and **false** means that it is not. Applies only to CBR and VBR class of service.
-vponly (true | false)	**true** means that the profile is for a VP connection and **false** means that it is not.

1.3.4.6.4 Displaying PNNI Profile Information

This command lets you display PNNI path computation profile information. Enter the following parameters:

```
myswitch::configuration atmroute pnni profile> show
 Node Profile Service MinFwdCR MinRevCR FwdClpType   RevClpType   FwdCLR  RevCLR
  1    1       cbr     N/A      N/A      clpEqual0    clpEqual0    N/A     N/A
      State     ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref
      inactive  mgmtEntry   false   false  false  false  aw       N/A     N/A
 Node Profile Service MinFwdCR MinRevCR FwdClpType   RevClpType   FwdCLR  RevCLR
  1    2       ubr     N/A      N/A      clpEqual0    clpEqual0    N/A     N/A
      State     ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref
      computed  cacheEntry  false   false  false  false  aw       0       0
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of the node to which this profile belongs.
Profile	The index number of the profile.
Service	Shows for which class of service this profile is used: either cbr, rtVbr, nrtVbr, abr, or ubr.
MinFwdCR	The minimum forward cell rate requirement.
MinRevCR	The minimum reverse cell rate requirement.
FwdClpType	**clpEqual0** means the requested CLR constraint in the forward direction is for the CLP0 stream. **clpEqual0OR1** means the requested CLR constraint in the forward direction is for CLP0+1 stream.
RevClpType	**clpEqual0** means the requested CLR constraint in the reverse direction is for the CLP0 stream. **clpEqual0OR1** means the requested CLR constraint in the reverse direction is for CLP0+1 stream.
FwdCLR	The forward CLR. Applies only to CBR and VBR class of service.
RevCLR	The reverse CLR. Applies only to CBR and VBR class of service.
State	The current state of the profile.
ProfileType	This is a read-only field. **mgmtEntry** means this profile is dynamically generated. **cacheEntry** means this profile is user-configured.
LoadBal	**true** means that load balancing is activated for the profile and **false** means that it is not. Applies only to CBR and VBR class of service.
VPOnly	**true** means that the profile is for a VP connection and **false** means that it is not.
OptCTD	**true** means that the profile is to optimize on CTD and **false** means that it is not. Applies only to CBR and VBR class of service.

Field	Description
OptCDV	**true** means that the profile is to optimize on Cell Delay Variation (CDV) and **false** means that it is not. Applies only to CBR and VBR class of service.
OptAdmWt	Shows if the profile will optimize on administrative weight.
NumAvd	A read-only field, for cache profiles only, showing the number of avoided links in this profile.
NumPref	A read-only field, for cache profiles only, showing the number of preferred links in this profile.

You can also display information about a specific node or profile as follows:

```
myswitch::configuration atmroute pnni> profile show [<nodeix>] [<profileix>] [advanced]
myswitch::configuration atmroute pnni> profile show 1 1
 Node Profile Service MinFwdCR MinRevCR FwdClpType   RevClpType   FwdCLR  RevCLR
  1    1       cbr     N/A      N/A      clpEqual0    clpEqual0    N/A     N/A
      State     ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref
      inactive  mgmtEntry   false   false  false  false  aw       N/A      N/A
```

The fields in this display are defined in the same manner as those in the previous example.

You can also display advanced information about all of the nodes and profiles or a specific node or profile as follows:

```
myswitch::configuration atmroute pnni profile> show advanced 1 2
 Node Profile Service MinFwdCR MinRevCR FwdClpType   RevClpType   FwdCLR  RevCLR
  1    2       ubr     N/A      N/A      clpEqual0    clpEqual0    N/A     N/A
      State     ProfileType LoadBal VPOnly OptCTD OptCDV OptAdmWt NumAvd NumPref
      computed  cacheEntry  false   false  false  false  aw       0        0

      No avoided link information for this profile
      No preferred link information for this profile
```

The fields in this display are defined in the same manner as those in the previous example. There is additional information given about avoided or preferred links, if any such information is available.

If no PNNI profiles have been configured, then the following is displayed:

```
myswitch::configuration atmroute pnni profile> show
No profile information is available
```

1.3.5 PNNI Policy Prefix Configuration Commands

These commands allow you to configure a policy prefix for a node. A policy allows you to impose rules on how a node propagates information to its peer group about other peer groups. Each policy consists of an ATM address prefix, one of three actions associated with the address, and an optional metric tag. (For more information about policy, see the Network Configuration manual for your switch.) You can display the list of available subcommands by typing **?** at the **policy** level.

```
myswitch::configuration atmroute policy> ?
  delete          modify          new             show
```


1.3.5.1 Deleting a PNNI Policy Prefix

This command allows you to delete an existing policy prefix. Enter the following parameters:

```
myswitch::configuration atmroute policy> delete <nodeix> <address> <len>
```

1.3.5.2 Modifying a PNNI Policy Prefix

This command allows you to modify an existing policy prefix. Enter the following parameters:

```
myswitch::configuration atmroute policy> modify <nodeix> <address> <len>
        [-type (internal | exterior | both)]
        [-action (summary | suppress | advertise)]
        [-mtag <tag>]
```

1.3.5.3 Creating a PNNI Policy Prefix

This command allows you to create a new policy prefix. Enter the following parameters:

```
myswitch::configuration atmroute policy> new <nodeix> <address> <len>
        [-type (internal | exterior | both)]
        [-action (summary | suppress | advertise)]
        [-mtag <tag>]
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
nodeix	The index number of the node to which the policy applies.
address	The 19-byte address prefix of the policy.
len	The address prefix length of the policy.
-type (internal | exterior | both)	The type of reachable addresses to which the policy applies. `internal` means the policy applies to internal reachable addresses within that node's FORE hierarchy area. `exterior` means the policy applies to exterior reachable addresses outside of that node's FORE hierarchy area. `both` means the policy applies to both internal and exterior addresses. The default is `both`.
-action (summary | suppress | advertise)	The policy for exchanging dynamic reachability address prefixes. Addresses matching a `summary` policy cause just the summarized prefix of the address to be announced to the node's peer group. Addresses matching a `suppress` policy are not announced to the node's peer group at all. Addresses matching an `advertise` policy cause the entire address to be announced to the node's peer group. An `advertise` policy is only used to advertise exceptions to a `suppress` policy. The default is `summary`.
-mtag <tag>	The metric tag associated with this policy. Look in the `Tag` field under **`conf atmroute pnni metric show`** to find the appropriate tag number. The default is 0.

1.3.5.4 Displaying PNNI Policy Prefix Information

This command allows you to display information about existing policy prefixes. Enter the following parameters:

```
myswitch::configuration atmroute policy> show
 Node Address                                  Plen Type     Action
 1    47.000580ffe1000000f21a355200204806790b00 72   both     summary
      State        MTag
      inactive     0
```

The fields in this display are defined as follows:

Field	Description
Node	The index number of the node to which this policy applies.
Address	The address prefix of the policy.
Plen	The address prefix length of the policy (the significant part of the address).
Type	The type of reachable addresses to which the policy applies. `internal` means the policy applies to internal reachable addresses within that node's FORE hierarchy area. `exterior` means the policy applies to exterior reachable addresses outside of that node's FORE hierarchy area. `both` means the policy applies to both internal and exterior addresses.
Action	The action to take when using this policy. Addresses matching a `summary` policy cause just the summarized prefix of the address to be announced to the node's peer group. Addresses matching a `suppress` policy are not announced to the node's peer group at all. Addresses matching an `advertise` policy cause the entire address to be announced to the node's peer group.
State	Indicates the current state of this policy. If there are no reachable addresses that match this policy, then the state is listed as `inactive`. When a summary policy is matched and is being used, the state is listed as `summarizing`. When a suppress policy is matched and is being used, the state is listed as `suppressing`. When an advertise policy is matched and is being used, the state is listed as `advertising`.
Mtag	The metric tag associated with this policy. See the `Tag` field under **`conf atmroute pnni metric show`**.

You can also display specific policy information as follows:

```
myswitch::configuration atmroute policy> show [<nodeix> [<address> <len>]]
myswitch::configuration atmroute policy> show 1
 Node Address                                  Plen Type     Action
 1    47.000580ffe1000000f21a355200204806790b00 72   both     summary
      State        MTag
      inactive     0
```

The fields in this display are defined in the same manner as those in the previous example.

1.3.6 SPANS ATM Route Configuration Commands

These commands allow you to modify various aspects of SPANS-NNI on a switch. You can display the list of available subcommands by typing **?** at the **spans** level.

```
myswitch::configuration atmroute spans> ?
  area              border            show
```

In order for part of a FORE ATM cloud to be a hierarchical SPANS area, all switches in that cloud must be running a software version that is at least *ForeThought* 4.0 or greater. Otherwise, SPANS connectivity between the hierarchical area and the SPANS area will be lost.

1.3.6.1 Setting the SPANS Area ID

This command enables you to set the SPANS area ID. Enter the following parameters:

```
myswitch::configuration atmroute spans> area <area>
```

This parameter is defined as follows:

Parameter	Description
area[1]	The ID of the area in the SPANS routing hierarchy to which this switch belongs. This number goes into the most significant byte of the SPANS ATM address. The default area ID for all switches is 242 in decimal.

1. The switch must be rebooted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

1.3.6.2 Setting the SPANS-NNI Border Switch Functionality

A switch that has a link to another switch belonging to a different SPANS area is considered a border switch. A border switch advertises reachability to its area to switches outside of its area, but it does not share its area's topology with the other switches. You should enable border switch functionality on all switches that are on the outside edges of all of the areas that you have established. This command lets you designate whether or not this switch will act as a SPANS-NNI border switch. Enter the following parameters:

```
myswitch::configuration atmroute spans> border (enable | disable)
```

This parameter is defined as follows:

Parameter	Description
enable | disable[1]	Entering `enable` (and rebooting) means that this switch will be a SPANS border switch. Entering `disable` (and rebooting) means that this switch will not be a SPANS border switch. The default is disable.

1. The switch software must be restarted for this command to take effect. Therefore, you must be in a local AMI session to perform this command.

1.3.6.3 Displaying SPANS-NNI Parameters

This command let you display all of the SPANS-NNI topology parameters. Enter the following parameters:

```
myswitch::configuration atmroute spans> show
SPANS Area ID           242
SPANS NNI border switch functionality is disabled
```

The fields in this display are defined as follows:

Field	Description
SPANS Area ID	The ID of the area in the SPANS routing hierarchy to which this switch belongs. This number goes into the most significant byte of the SPANS ATM address.
SPANS NNI border switch functionality is disabled	If this functionality is `enabled`, this switch is a SPANS-NNI border switch. If it is `disabled`, this switch is not a SPANS-NNI border switch.

1.4 Switch Board Configuration Commands

This submenu lets you configure default values for the switch board. Type **?** at the **board** level to display the available subcommands.

```
myswitch::configuration board> ?
  clockscale       oam              show
```

1.4.1 Configuring the Clock Scaling Factor on a Switch Board

This is an advanced command that lets you set the clock scaling factor for traffic policing on a switch board. The switch board represents units of time (i.e., burst tolerances) in internal units of clock ticks. Because of the 40 MHz clock used on the switch fabric, the maximum unit of time that can be used by the traffic policing hardware is 0.838 seconds. However, the burst tolerance of some VBR connections is larger than 0.838 seconds, so they can not be correctly policed by the switch. To accommodate these cases, it is possible to scale the clock to represent larger amounts of time with the same number of ticks. Enter the following parameters:

```
myswitch::configuration board> clockscale <board> <factor>
```

These parameters are defined as follows:

Parameter	Description
board[1]	The number of the board (1 - 4) on which the clockscale is being configured.
factor[2]	The factor by which you want to scale the clock. The scaling factor multiplied by 0.838 seconds should be greater than the burst tolerance of the connection. The default is 1.

1. The HDCOMP ASIC must be version 1 or greater to support changing the clockscale. To display the ASIC version, use the **conf board show advanced** command.

2. This command is only useful when performing traffic policing on VBR traffic with an extremely large burst tolerance that is destined for a very low speed (DS1) link. If these conditions are not represented in your network, it is recommended that you leave this value at the default setting.

If you change the clockscale setting, the following warning is displayed:

```
myswitch::configuration board> clockscale 1 2
  ***** WARNING *****
Changing the Clock Scale Factor will have undesired effects on
existing policed connections until the switch software is restarted.
Restart the switch software [n]?
```

Entering **n** or pressing <**ENTER**> aborts the command. Entering **y** causes the switch to restart and use the new clockscale setting.

1.4.2 Configuring OAM Cell Processing on a Switch Board

If you have enabled OAM cell processing on some ports on a switch board using the **conf port aisrdi enable** command, this command lets you override OAM cell transmission and reception on all ports on that switch board. (See Section 1.12.3 for more information about the **conf port aisrdi** command.) This command is useful if an errant node that is attached to one of the ports on your switch board is flooding your board with too many OAM cells.

When **conf board oam disable** is entered, the port level settings are still retained, but OAM cell processing ceases on all ports on that board. When **conf board oam enable** is entered, all ports on that board use their last port level settings again, so OAM cell processing starts again only on the ports on which it was last enabled.

```
myswitch::configuration board> oam <board> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
board	The number of the board on which OAM cell processing is being configured. Can be 1, 2, 3, or 4 for an ASX-1000 or a TNX-1100, with 1 being the leftmost slot. On all other switches, this number is always 1 because there is only one board in those switches.
enable | disable	Entering **enable** returns all ports on this board to their last port level settings for OAM cell processing before this functionality was disabled. Entering **disable** causes OAM cell processing to stop on all ports on this board, despite the **conf port aisrdi** settings. These settings are still retained. The default is **disable**.

All switches respond to OAM end-to-end loopback requests for originating/terminating VPTs. All switches also pass through OAM end-to-end loopback requests and responses that are received for VPCs and VCCs transparently.

ASX-1000s and TNX-1100s respond to all OAM segment loopback requests, while ASX-200BXs, ASX-200WGs, LE 155s, and TNX-210s only respond to OAM segment loopback requests received for originating/terminating VPTs. OAM segment loopback requests received for VPCs and VCCs are dropped by these types of switches. Also, the insertion of OAM loopback request cells is not supported.

1.4.3 Displaying the Board Configuration

This command shows the current configuration of the switch board (switch fabric). Enter the following parameters:

```
myswitch::configuration board> show
 Board  Model       HW-Ver  Mfg-Rev  S/N     NMs  ATM/OAM
 2      asx1000     0       D        4084    3    disabled
```

The fields in this display are defined as follows:

Field	Description
Board	The number of the slot in which the board (switch fabric) is installed.
Model	The type of switch this is.
HW-ver	The hardware version of this board.
Mfg-Rev	The manufacturing revision number.
S/N	The serial number of this switch board.
NMs	The number of network modules installed in this board.
ATM/OAM	Shows if OAM cell processing is enabled or disabled on this switch board. **disabled** means OAM cell processing is stopped on all ports on this board, despite the **conf port aisrdi** settings. **enabled** returns all ports on this board to their last **conf port aisrdi** settings before this functionality was disabled.

You can also display advanced information about a switch board. Enter the following:

```
myswitch::configuration board> show [<board>] [advanced]
myswitch::configuration board> show advanced
Board   ClockScale   HDCOMPversion
1               1              0
```

The fields in this display are defined as follows:

Field	Description
Board	The number of the slot in which the board (switch fabric) is installed.
ClockScale	The factor by which the clock is scaled for traffic policing.
HDCOMPversion[1]	The version number of the HDCOMP ASIC on this switch board.

1. The HDCOMP ASIC must be version 1 or greater to support the AAL5 partial packet policing command under **conf port pppolicing** and to support changing the clockscale under **conf board clockscale**.

1.5 CEC Configuration

The **cec** commands let you configure the Timing Control Module (TCM) on a CEC-Plus. The CEC-Plus is an environmental/timing management subsystem. To display the **cec** commands, a TCM must be installed in the switch. You can display the list of available subcommands by typing **?** at the **cec** level.

```
myswitch::configuration cec> ?
  alarms>          slotx>           sloty>           timing>
```


1.5.1 Alarms Configuration Commands

This submenu lets you configure alarm conditions that are a result of various environmental and synchronization timing conditions. You can display the list of available subcommands by typing **alarms ?** at the **cec** level.

```
myswitch::configuration cec> alarms ?
  disable          enable           relays>          show
```

1.5.1.1 Disabling an Alarm

This command lets you disable an alarm. Enter the following parameters:

```
myswitch::configuration cec alarms> disable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major | minor	Designates whether the alarm type causes a major alarm or a minor alarm when that condition occurs.
alarm type	Indicates the alarm condition. Valid parameters are displayed in the AlarmType field when the command string **conf alarms show** is entered.

For example, to disable an overtemperature condition that is detected by the overtemperature sensor as a minor alarm, enter the following parameters:

```
myswitch::configuration cec alarms> disable minor tempSensorOverTemp
```

To verify that the change has taken effect, you can display the alarms:

```
myswitch::configuration alarms> show
 AlarmType                    AlarmStatus    MinorAlarm   MajorAlarm
 powerSupplyInputFailed       active         disabled     enabled
 powerSupplyOutputFailed      active         disabled     enabled
 fanBankFailed                active         disabled     enabled
 tempSensorOverTemp           inactive       disabled     enabled
 Major alarm relay status: on
 Minor alarm relay status: off
```

1.5.1.2 Enabling an Alarm

This command lets you enable an alarm. Enter the following parameters:

```
myswitch::configuration cec alarms> enable (major | minor) <alarm type>
```

These parameters are defined as follows:

Parameter	Description
major | minor	Designates whether the alarm type causes a major alarm or a minor alarm when that condition occurs.
alarm type	Indicates the kind of alarm condition. Valid parameters are displayed in the `AlarmType` field when the command string **`conf alarms show`** is entered at the prompt.

For example, to enable an overtemperature condition that is detected by the overtemperature sensor as a major alarm, enter the following parameters:

```
myswitch::configuration cec alarms> enable major tempSensorOverTemp
```

To verify that the change has taken effect, you can display the alarms:

```
myswitch::configuration alarms> show
 AlarmType                    AlarmStatus    MinorAlarm   MajorAlarm
 powerSupplyInputFailed       active         disabled     enabled
 powerSupplyOutputFailed      active         disabled     enabled
 fanBankFailed                active         disabled     enabled
 tempSensorOverTemp           inactive       disabled     enabled
 Major alarm relay status: on
 Minor alarm relay status: off
```

1.5.1.3 Configuring an Alarm Relay

These commands let you configure or display alarm relays. You can show the list of available subcommands by typing **relays ?** at the **alarms** level. Enter the following parameters:

```
myswitch::configuration cec alarms> relays ?
  set              show
```

1.5.1.3.1 Setting an Alarm Relay

This command lets you set an alarm relay. Enter the following parameters:

```
myswitch::configuration cec alarms relays> set <relay number> (major | minor | unused)
```

These parameters are defined as follows:

Parameter	Description
relay number	Indicates the number which corresponds to one of the five alarm relay LEDs on the front of the SCP.
major | minor | unused	Indicates if you want the alarm relay to be major, minor, or unused.

1.5.1.3.2 Displaying the Alarm Relays

This command lets you display the alarm relays. Enter the following parameters:

```
myswitch::configuration cec alarms relays> show
 Relay           Alarm          Current
 Number         Function         State
    1            major            on
    2            minor            on
    3            unused           off
    4            unused           off
    5            major            on
```

The fields in this display are defined are defined as follows:

Field	Description
relay number	Shows the number which corresponds to one of the five alarm relay LEDs on the front of the SCP.
Alarm Function	Shows whether the alarm relay has been configured as major, minor, or unused.
Current State	Shows whether the alarm relay is on (in a state of alarm) or off (not in a state of alarm).

1.5.1.4 Displaying Alarm Conditions

This command lets you display the status of all alarms. Enter the following:

```
myswitch::configuration cec alarms> show
 AlarmType                    AlarmStatus    MinorAlarm   MajorAlarm
 powerSupplyInputFailed       active         disabled     enabled
 powerSupplyOutputFailed      active         disabled     enabled
 fanBankFailed                active         disabled     enabled
 tempSensorOverTemp           inactive       disabled     enabled
 Major alarm relay status: on
 Minor alarm relay status: off
```

The fields in this display are defined as follows:

Field	Description
AlarmType	Displays the name of the alarm.
AlarmStatus	Shows whether the state of the alarm is active (alarming) or inactive (not alarming). An alarm is active if the underlying condition is detected. For power supplies, the input failed alarm condition is active if the input voltage is not within the nominal range for the supply. This does not necessarily mean that an output failure will result. A power supply output failure condition is active if any power supply is failing or if it is physically removed.
MinorAlarm	`disabled` means that this alarm type will not cause a minor alarm. `enabled` means that this alarm type causes a minor alarm.
MajorAlarm	`disabled` means that this alarm type will not cause a major alarm. `enabled` means that this alarm type causes a major alarm.
Major Alarm relay status	`off` means that no major alarms are currently active. `on` means that one or more major alarms are currently active. Look at the `AlarmStatus` field to see which condition is in a state of alarm.
Minor Alarm relay status	`off` means that no minor alarms are currently active. `on` means that one or more minor alarms are currently active. Look at the `AlarmStatus` field to see which condition is in a state of alarm.

1.5.2 TCM Selection

The **slotx** and **sloty** submenus allow you to choose a TCM for further configuration. To configure parameters on the TCM in slot X (the top slot), type **slotx** at the **cec** level. To configure the TCM in slot Y (the bottom slot), type **sloty** at the **cec** level.

1.5.3 TCM Configuration Commands

Once an individual TCM has been selected for configuration, you can configure IP parameters, change the name of the TCM, display information about the TCM, and so on. You can display the list of available subcommands by typing **?** at the **slotx** or **sloty** sublevel. The commands for both levels are the same, but they are only described once with examples that read **slotx**.


```
myswitch::configuration cec slotx> ?
  ip>              name             rs232>           show
  snmp>            timezone
```

1.5.3.1 IP Configuration Commands

The `ie0 and ie1` interfaces of all installed TCMs and the `ie0` interface of all installed SCPs must all reside on the same subnet.

These commands let you change the IP configuration of the TCM's interfaces. You can display the list of available subcommands by typing **ip ?** at the **configuration** level.

```
myswitch::configuration cec slotx ip> ?
  address          admin            broadcast        mask
  route>           show
```

1.5.3.1.1 Configuring the IP Address

This command lets you configure an IP address for one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> address <interface> <address>
```

These parameters are defined as follows:

Parameter	Description
interface	Indicates the name of the IP interface to be managed.
address	Indicates the IP address for this interface.

1.5.3.1.2 Configuring the IP State

This command lets you enable or disable the IP interfaces on the TCM. Enter the following parameters:

```
myswitch::configuration cec slotx ip> admin <interface> (up|down)
```

These parameters are defined as follows:

Parameter	Description
interface	Indicates the name of the IP interface to be managed.
up | down	Entering up enables the designated interface. Entering down disables the designated interface.

1.5.3.1.3 Configuring the IP Broadcast Address

This command allows you to modify the broadcast address for one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> broadcast <interface> (0|1)
```

These parameters are defined as follows:

Parameter	Description
interface	Indicates the name of the IP interface.
0|1	Indicates the IP broadcast type for this interface. This is the host portion of the IP address that is used for routing. Entering 1 causes the host portion of the IP address to be set to all 1s. Entering 0 causes the host portion of the IP address to be set to all 0s.

1.5.3.1.4 Configuring the IP Subnet Mask

This command allows you to modify the IP subnet mask of one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> mask <interface> <mask>
```

These parameters are defined as follows:

Parameter	Description
interface	Indicates the name of the IP interface.
mask	Indicates the subnet mask for this IP interface. It should be entered in dotted decimal notation (e.g., 255.255.255.0).

1.5.3.1.5 Configuring IP Routes

This command allows you to add a static IP route to the local IP routing table, delete a static IP route from the local IP routing table, or list the current static IP routes in the local IP routing table for one of the TCM's IP interfaces. You can display the list of available subcommands by typing **`route ?`** at the **`ip`** level.

```
myswitch::configuration cec slotx ip> route ?
  new             delete          show
```

1.5.3.1.5.1 Adding an IP Route

This command lets you create an IP route for one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip route> new (default|<destination-ipaddress>)
<gateway> [<metric>] [(host | net)]
```

These parameters are defined as follows:

Parameter	Description
default	This parameter must be specified to create a default route.
destination-ipaddress	Indicates the destination IP network number.
gateway	Indicates the gateway address to the destination IP network number.
metric	Indicates the number of hops to the destination IP network. The default value of `1` is used if no value is entered. If `1` is specified, the route is created with the `RTF_GATEWAY` flag.
host | net	Using `host` indicates this is a host-specific route with the destination being a specific node's IP address. Using `net` indicates this is a network-specific route with the destination being a network IP address. The default value of `net` is used if no value is entered.

1.5.3.1.5.2 Deleting an IP Route

This command lets you delete an IP route from one of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip route> delete (default|<destination-ipaddress>)
<gateway>
```

These parameters are defined as follows:

Parameter	Description
default	A default must be specified to delete a default route.
destination-ipaddress	Indicates the destination IP network number.
gateway	Indicates the gateway address to the destination IP network number.

1.5.3.1.5.3 Showing the IP Routes

This command lets you display the current IP routes for the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip route> show
Destination      Gateway             Metric          Interface       Flags
default          198.29.31.75        1               ie0             G
127.0.0.1        127.0.0.1           0               lo0
169.144.85.3     198.29.31.75        1               ie0             G
198.29.31.0      198.29.31.28        0               ie0
```

The fields in this display are defined as follows:

Field	Description
Destination	Indicates the destination IP network number.
Gateway	Indicates the gateway address to the destination IP network number.
Metric	Shows the number of hops to the destination IP network. The default is `1`
Interface	Shows the local IP interface used to get to the destination IP network.
Flags	Shows `H` if the route is host-specific (created with the `RTF_HOST` flag set). Shows `G` if the route is network-specific (created with the `RTF_GATEWAY` flag set).

1.5.3.1.6 Displaying the IP Interface Configuration

This command allows you to display information about the configuration of the TCM's IP interfaces. Enter the following parameters:

```
myswitch::configuration cec slotx ip> show
interface  state       address         netmask         broadcast
ie0        up          169.144.28.125  255.255.255.0   169.144.28.255
ie1        up          169.144.28.225  255.255.255.0   169.144.28.255
lo0        up          127.0.0.1       255.0.0.0       N/A
```

The fields in this display are defined as follows:

Field	Description
interface	Indicates the name of the IP interface.
state	Lists the administrative state of the IP interface.
address	Displays the IP address of the IP interface.
netmask	Shows the netmask address of the IP interface.
broadcast	Indicates the broadcast address of the IP interface.

You may also designate a single interface to be displayed by entering **show** and the specific interface name at the prompt as follows:

```
myswitch::configuration cec slotx ip> show ie0
interface  state       address         netmask         broadcast
ie0        up          169.144.28.125  255.255.255.0   169.144.28.255
```

The fields in this display are defined in the same manner as those listed above in the example for showing the configuration of all of the IP interfaces.

1.5.3.2 Setting or Changing the TCM's Name

This command lets you set or change the name of the TCM. Enter the following parameters:

```
myswitch::configuration cec slotx> name <name>
```

This parameter is defined as follows:

Parameter	Description
name	Indicates the new system name for the TCM.

For example, to set the TCM's name to `linus`, enter the following parameters:

```
myswitch::configuration cec slotx> name linus
```

1.5.3.3 Serial Port Configuration

This command lets you display configuration information for the RS-232 serial port on the front panel of the TCM. You can display the available subcommand by typing **?** at the **rs232** level.

```
myswitch::configuration cec slotx rs232> ?
  show
```

1.5.3.3.1 Displaying Serial Port Information

This command allows you to display the settings for the RS-232 serial port on the TCM. Enter the following parameters:

```
myswitch::configuration cec slotx rs232> show
Port     Type        Speed   Flow     Bits   Stops      Parity
A        rs232        9600   none        8   one        none
```

The fields in this display are defined as follows:

Field	Description
Port	Shows the physical port designation.
Type	Shows the signalling standard used.
Speed	Shows the receive / transmit rate in bits per second.
Flow	Shows the type of flow control implemented on the given port.
Bits	Shows the number of bit times in a single character.
Stops	Shows the number of stop bits in a character frame.
Parity	Shows the parity setting for the ports.

1.5.3.4 Displaying TCM Information

This command lets you display information about the TCM to which you are logged in. Enter the following parameters:

```
myswitch::configuration cec slotx> show
TCM 'linus', Type cec-plus, up 0 days 18:15
Hardware version A, Software version S_ForeThought_5.1.0 (1.14891)
Serial number                          30
Slot                                   X
State                                  active
Time zone
External Inputs (1-5)                  off off off off off
Change to active operation occurred at Nov 17  17:16:56 1997
ESI module is present.
```


The fields in this display are defined as follows:

Field	Description
TCM	This TCM's system name.
Type	Shows what type of TCM this is.
up	The amount of time (in days, hours, and minutes) since this TCM has been rebooted.
Hardware version	The hardware version of this TCM.
Software Version	The software version being used by this TCM.
Serial number	The serial number of this TCM card.
Slot	The slot in which this TCM resides. X indicates the top slot and Y indicates the bottom slot.
State	The current state of this TCM. `active` means this TCM is the controller and is functioning properly. `standby` means this is the standby TCM. `offline` means the timing has failed on this TCM.
Time zone	The time zone configured for this TCM. If this field reads `N/A`, then this value has not been configured yet.
External Inputs	The current state of each of the five front panel external inputs from the viewpoint of this TCM. Can be either `on` (input being received) or `off` (no input).
active | standby | offline	Shows when this TCM control software switched to the current operating mode.
ESI module	The External Synchronization Interface (ESI) card status from the viewpoint of this TCM. This should always be `present`. `absent` indicates a failure of the ESI interface logic.
Other TCM status	If another TCM is not plugged in, nothing is displayed. If another TCM is plugged in, shows the software status of the other TCM from the viewpoint of this TCM. If this TCM is the controller, `normal` means the standby TCM is actively updating and waiting to be called into service, and `unknown` means the standby TCM is down. If this TCM is the standby, `active` means the controller TCM is functioning normally.

1.5.3.5 SNMP Configuration Commands

These commands enable you to manage the SNMP communities and traps. You can display the list of available subcommands by typing **snmp ?** at the **configuration** level.

```
myswitch::configuration cec slotx> snmp ?
trap>
```

1.5.3.5.1 Configuring SNMP Traps

These commands help you to manage SNMP traps. You can display the list of available subcommands by typing **trap ?** at the **snmp** level.

```
myswitch::configuration cec slotx snmp> trap ?
delete         new            show
```

1.5.3.5.1.1 Deleting an SNMP Trap Entry

This command allows you to delete an existing SNMP trap destination. Before deleting a trap that may need to be recreated later, show the list of current SNMP traps and either copy and save the screen or write down the trap destinations. You will also need to show the list of current SNMP traps in order to find the number of the trap to be deleted. Enter the following parameters to delete a trap entry:

```
myswitch::configuration cec slotx snmp trap> delete <trap>
```

The parameter for deleting is defined as follows:

Parameter	Description
trap	Indicates the number of the trap destination in the list of current SNMP traps that is to be removed.

For example, to delete trap 198.29.31.130, first list the traps to find its number and copy the address in case you want to recreate it later:

```
myswitch::configuration cec slotx snmp trap> show
Trap    Destination
1       192.88.243.18
2       198.29.16.14
3       198.29.16.18
4       198.29.23.39
5       198.29.31.130
```

Then enter the following parameters:

```
myswitch::configuration cec slotx snmp trap> delete 5
```

You can display the list again to verify that the trap has been deleted:

```
myswitch::configuration cec slotx snmp trap> show
Trap    Destination
1       192.88.243.18
2       198.29.16.14
3       198.29.16.18
4       198.29.23.39
```


1.5.3.5.1.2 Creating an SNMP Trap Entry

This command allows you to specify a host to which an TCM can send SNMP traps. Enter the IP address of the SNMP trap destination to be added. Repeat this for as many SNMP trap destinations as needed. Traps are active as soon as they are set. Enter the following parameters:

```
myswitch::configuration cec slotx snmp trap> new <ipaddress>
```

The parameter for specifying is defined as follows:

Parameter	Description
ipaddress	Indicates the IP address of the trap destination to be created.

1.5.3.5.1.3 Displaying the SNMP Trap Entries

This command enables you to list all of the current SNMP traps. Enter the following:

```
myswitch::configuration cec slotx snmp trap> show
Trap    Destination
1       192.88.243.18
2       198.29.16.14
3       198.29.16.18
4       198.29.23.39
5       198.29.31.130
```

If no SNMP traps have been configured, the following message is displayed:

```
No trap information is available
```

1.5.3.6 Setting or Changing the Timezone

This command enables you to set or change the timezone on the TCM. Enter the following:

```
myswitch::configuration cec slotx> timezone <timezone>
```

The parameter for setting or changing is defined as follows:

Parameter	Description
timezone	The time zone configured for this TCM. The TCM supports and automatically converts from Standard to Daylight Savings time for the following time zones: `EST5EDT` (Eastern Standard Time), `CST6CDT` (Central Standard Time), `MST7MDT` (Mountain Standard Time), `PST8PDT` (Pacific Standard Time), `AKST9AKDT` (Alaska Standard Time).

Locations outside of the time zones listed above must supply the following POSIX standard 1003.1-1988 formula for switching between Daylight Savings Time and Standard Time:

`stdoffset [dst[offset][, start[/time], end[/time]]]`

The time zones have the following meanings:

Field	Description
std and dst	Indicates 3 or more bytes that designate standard (`std`) or Daylight Savings Time (`dst`). Only `std` is required; if `dst` is omitted, then it does not apply in this location. Can use uppercase or lowercase letters and any characters, except a leading colon(:), digits, comma (,), minus (-), plus (+), and ACSII NUL.
offset	Indicates the value to add to local time to equal Greenwich Mean Time. `offset` is of the form: **hh[:mm[:ss]]** Hour (`hh`) is required and can be a single digit between `0` and `24`. Minutes (`mm`) and seconds (`ss`) are optional and are between `0` and `59`. If no `offset` follows `dst`, it is assumed to be one hour ahead of `std`. If preceded by a "`-`", the time zone is east of the Prime Meridian; otherwise it is west (with an optional "`+`")
start[/time], end[/time]	`start` indicates the date when the change occurs from `std` to `dst`. `end` indicates the date when you change back. Both `start` and `end` are of the form: **Mm.n.d** `d` is the `d`-th day ($0 \le d \le 6$) of week `n` of month `m` of the year ($1 \le n \le 5$, $1 \le m \le 12$), where week 5 is the last `d` day in month `m`, which can occur in either the fourth or the fifth week). Week 1 is the first week in which the `d`-th day occurs. Day 0 is Sunday. `time` is of the same format as `offset`, except that no leading "`-`" or "`+`" is allowed. If `time` is not entered, the default of `02:00:00` is used.

1.5.4 CEC Timing Configuration

These commands let you configure external synchronization timing. Type **timing ?** at the **cec** level to display the list of available subcommands.

```
myswitch::configuration cec> timing ?
  bits>            failover>        mode             primary
  references       revertive>       secondary        show
```

1.5.4.1 BITS Timing Configuration Commands

These commands let you configure the timing input and output for the BITS clock. You can display the list of available subcommands by entering **bits ?** at the **timing** level. Enter the following:

```
myswitch::configuration cec timing> bits ?
  coding           framing          level
```

1.5.4.1.1 BITS Coding Configuration

This command lets you configure the coding of the DS1 BITS interface or the E1 BITS interface for this TCM. You can get to this level by entering **coding** at the **bits** level. Enter the following parameters:

```
myswitch::configuration cec timing bits> coding (ami | b8zs) for DS1 interface
                                    or: coding (ami | hdb3) for E1 interface
```

The parameters for configuring are defined as follows:

Parameter	Description
ami	Indicates that Alternate Mark Inversion (AMI) coding should be used for the BITS interface on the TCM. This means zeros are represented by 01 during each bit cell, and ones are represented by 11 or 00, alternately, during each bit cell. This technique requires that the sending device maintain ones density. Ones density is not maintained independent of the data stream.
b8zs	Indicates that Binary 8-Zero Substitution (B8ZS) coding should be used for the TCM. This means a special code is substituted whenever eight consecutive zeros are sent through the link. This code is then interpreted at the remote end of the connection. This technique guarantees ones density independent of the data stream.
hdb3	Indicates that High Density Bipolar (HDB3) coding should be used for the TCM. HDB3 is a bipolar coding method that does not allow more than 3 consecutive zeroes.

1.5.4.1.2 BITS Framing Configuration

This command allows you to configure the framing format of the DS1 BITS interface or E1 BITS interface for this TCM. You can get to this level by entering **framing** at the **bits** level. Enter the following parameters:

```
myswitch::configuration cec timing bits> framing (d4 | esf) for DS1 interface
                                         or: framing (mf | crc4mf) for E1 interface
```

The parameters for configuring are defined as follows:

Parameter	Description
d4	Indicates that D4 (also known as Superframe (SF)) framing should be used for the BITS interface on the TCM. SF consists of 12 frames of 192 bits each, with the 193rd bit providing error checking and other functions.
esf	Indicates that Extended Superframe (ESF) framing should be used for the BITS interface on the TCM. ESF provides frame synchronization, cyclic redundancy, and data link bits.
mf	MF indicates that multiframe E1 framing is used.
crc4mf	CRC4MF indicates that multiframe E1 framing with CRC-4 checksums is used.

1.5.4.1.3 BITS Level Configuration

This command lets you configure the output level (dB) of the DS1 BITS interface or E1 BITS interface for this TCM. This command is only applicable to DS1 BITS interfaces.

```
myswitch::configuration cec timing bits> level (0.6 | 1.2 | 1.8 | 2.4 | 3.0)
```

The parameters for configuring are defined as follows:

Parameter	Description
0.6	Indicates that the output level for the BITS interface is 0.6 dB.
1.2	Indicates that the output level for the BITS interface is 1.2 dB.
1.8	Indicates that the output level for the BITS interface is 1.8 dB.
2.4	Indicates that the output level for the BITS interface is 2.4 dB.
3.0	Indicates that the output level for the BITS interface is 3.0 dB.

1.5.4.2 Failover Timing Configuration

This command lets you configure the timing failover delay. You can display the available sub-command by typing **`failover ?`** at the **`timing`** level.

```
myswitch::configuration cec timing> failover ?
  delay
```

1.5.4.2.1 Configuring the Failover Timing Delay

This command lets you set the delay, in whole seconds, between the time that the primary reference fails and the time that the TCM is told to switch over to the secondary reference. Enter the following parameters:

```
myswitch::configuration cec timing failover> delay <seconds>
```

The parameter for setting is defined as follows:

Parameter	Description
seconds	Indicates the amount of time after the failure of the primary reference before the TCM is instructed to switch to the secondary reference. The default is `0` seconds.

The failover delay should be left at `0` under normal circumstances. This parameter is only meaningful when the timing mode is `automatic`.

1.5.4.3 Timing Mode Configuration

This command lets you configure the timing reference to be used on the TCM. You can get to this level by entering **mode** at the **timing** level. Enter the following parameters:

```
myswitch::configuration timing> mode (freerun | primary | secondary | automatic | bits)
```

The parameters for configuring are defined as follows:

Parameter	Description
freerun	Indicates that the TCM must use the local oscillator as its timing source.
primary	Indicates that the TCM must use the primary timing source.
secondary	Indicates that the TCM must use the secondary timing source.
automatic	This is the default mode. See the *CEC-Plus Installation and User's Manual* for a description of how this mode works.
bits	Indicates that the TCM will automatically use the most appropriate BITS input.

It is recommended that the `freerun`, `primary`, and `secondary` modes only be used during diagnostics and maintenance because the TCM will not failover to another source when it is in one of these modes.

`automatic` mode is only valid when the primary and secondary sources are recovered from network modules.

1.5.4.4 Primary Timing Configuration

This command enables you to select the primary clock source from any of the switch fabrics' exported clocks. Enter the following parameters:

```
myswitch::configuration cec timing> primary fabric (1 | 2 | 3 | 4) (primary | secondary)
```

The parameter for configuring is defined as follows:

Parameter	Description
fabric (1|2|3|4) (primary| secondary)	Indicates the primary timing source is to be taken from one of the exported clocks (either primary or secondary) from one of the switch fabrics (1 - first (leftmost slot), 2 - second slot, 3 - third slot, 4 fourth slot) switch fabric.

Before you configure the primary timing source, use the **`conf timing references`** command to display all of the possible clocking references, their specific sources, and whether or not they are actually available for you to use. The freerun oscillator is not listed there because it is always available.

1.5.4.5 Displaying Timing References

This commands lets you display all of the possible timing references from the switch. Enter the following parameters:

```
myswitch::configuration cec timing> references
Reference               Source          Status
fabric 1 primary        1A1             available
fabric 1 secondary      1B2             available
fabric 2 primary        2A1             available
fabric 2 secondary      2B2             available
fabric 3 primary        3A1             available
fabric 3 secondary      3B2             available
fabric 4 primary        4A1             available
fabric 4 secondary      4B2             available
tcm X                   BITS1           available
tcm Y                   BITS2           unavailable
```

The fields in this display are defined as follows:

Fields	Description
Reference	Shows the name of the timing reference.
Source	Shows from which network module port or BITS clock the timing is being derived for this fabric or TCM. If the port is listed in regular BNP notation (e.g., 3B2), this indicates the exported timing source from this port. If the port is listed as 3B (no timing), then this network module does not support distributed timing. If the port is listed as 3B OSC, this indicates the timing source is the crystal oscillator on that network module. If the port is listed as 3B (down), then this network module has been removed.
Status	Shows if the timing source is available or not.

1.5.4.6 Revertive Timing Configuration

These commands allow you to enable or to disable revertive switching, or to configure the length of the delay between the time that the failed primary clock is restored and the time that the TCM is told to switch back to the primary clock again. You can get to this level by entering **`revertive ?`** at the **`timing`** level.

```
myswitch::configuration cec timing> revertive ?
  delay            disable          enable
```


Revertive timing is only available when the mode is configured to be **`automatic`** under **`conf timing mode`**.

1.5.4.6.1 Configuring the Revertive Timing Delay

When revertive timing is enabled and the primary clock fails, the TCM is told of the failure and is instructed to switch to the timing source that is configured as the secondary clock. To ensure that the primary source is good when it returns, this command lets you configure the amount of time, in whole seconds, between the time that the primary clock is restored and the time that the TCM is told to switch back to the primary clock again. Enter the following parameters:

```
myswitch::configuration cec timing revertive> delay <seconds>
```

The parameter for configuring is defined as follows:

Parameter	Description
delay	Indicates the amount of time after the restoration of the primary timing reference before the TCM is instructed to return to the primary timing reference. The default is 3 seconds.

1.5.4.6.2 Disabling Revertive Timing Delay

This command lets you disable the revertive switching for timing sources on this TCM. When you disable revertive switching, you only turn it off. If you enable it again, the TCM uses the value that you last configured for the delay using **`conf timing revertive delay`**. To disable the revertive timing delay, enter the following parameters:

```
myswitch::configuration cec timing revertive> disable
```

The parameter for disabling is defined as follows:

Parameter	Description
disable	Indicates that the revertive timing delay is going to be turned off.

This command takes effect as soon as you enter it.

1.5.4.6.3 Enabling the Revertive Timing Delay

This command lets you enable the revertive switching delay for timing sources on this TCM. When you enable the delay, the TCM uses the value that you last configured for the delay using **`conf timing revertive delay`**. To enable the revertive timing delay, enter the following parameters:

```
myswitch::configuration cec timing revertive> enable
```

The parameter for enabling is defined as follows:

Parameter	Description
enable	Indicates that the revertive timing delay is going to be turned on.

This command takes effect as soon as you enter it.

1.5.4.7 Secondary Timing Configuration

This command enables you to select the secondary clock source from any of the switch fabrics' exported clocks. You can get to this level by entering **secondary** at the **timing** level. Enter the following parameters:

```
myswitch::configuration cec timing> secondary fabric (1 | 2 | 3 | 4) (primary|secondary)
```

The parameter for configuring is defined as follows:

Parameter	Description
fabric (1|2|3|4) (primary| secondary)	Indicates the secondary timing source is to be taken from one of the exported clocks (either primary or secondary) from one of the switch fabrics (1 - first (leftmost slot), 2 - second slot, 3 - third slot, 4 fourth slot) switch fabric.

Before you configure the secondary timing source, use the **conf timing references** command to display all of the possible clocking references, their specific sources, and whether or not they are actually available for you to use.

1.5.4.8 Displaying Timing

This command lets you display the timing information that has been configured. Enter the following parameters:

```
myswitch::configuration cec timing> show
ESI module on 'linus', Card type DS1 Stratum 4
DS1 BITS interface framing esf, line coding b8zs
output level 0.6 dB

PLL Status                              freerun
Current Timing Reference                secondary
Requested Timing Reference              secondary

Primary Reference (2D1)                 unavailable
Secondary Reference (2A1)               unavailable

BITS1 Reference                         unavailable
BITS2 Reference                         unavailable

Revertive Switching                     enabled
Revertive Switching Delay               10
Failover Switching Delay                3
```

The fields in this display are defined as follows:

Field	Description
ESI module	Shows the name of the TCM.
Card type	Shows the ESI card type for this TCM.
DS1/E1 BITS interface framing	Shows the framing format of the BITS interface for this TCM. Can be DS1: `d4` or `esf`, `E1:mf` or `crc4mf`.
line coding	Shows the coding format of the BITS interface for this TCM. Can be DS1: `ami` or `b8zs`, `E1: ami` or `hdb3`.
output level	Shows the output level, in dB, of the DS1 BITS interface for this TCM. Can be `0.6`, `1.2`, `1.8`, `2.4`, or `3.0`.
PLL Status	Shows the phase-locked loop (PLL) status for this TCM. Can be `freerun` meaning the local oscillator on the TCM is being used, `locked` meaning the current clock is good, `holdover` meaning the TCM has detected a clock source error and is using the last valid clock source, `acquire` meaning the TCM is trying to lock on to the current clock (this may take up to five minutes), or `refqual` meaning the reference quality of the new clock is out of specification.

Field	Description
Current Timing Reference	Shows the actual timing reference that is currently being used. Can be `BITS1`, `BITS2`, `primary`, `secondary`, or `freerun`.
Requested Timing Reference	Shows the timing reference that was configured. If this source fails, it will not match what is currently being used. Can be `bits`, `automatic`, `primary`, `secondary`, or `freerun`.
Primary Reference	Shows the timing source configured as the primary source. Can be one of the primary or secondary clocks exported from one of the switch fabrics.
Primary Status	Shows whether the timing source configured as the primary source is currently `available` or `unavailable`.
Secondary Reference	Shows the timing source configured as the secondary source. Can be one of the primary or secondary clocks exported from one of the switch fabrics.
Secondary Status	Shows whether the timing source configured as the secondary source is currently `available` or `unavailable`.
Revertive Switching	Shows whether revertive switching is `enabled` or `disabled`.
Revertive Switching Delay	Shows the amount of time, in seconds, between the time that the primary clock is restored and the time that the TCM switches back to the primary clock again.
Failover Switching Delay	Shows the amount of time, in seconds, after the failure of the primary clock source before the TCM switches to the secondary clock source.

If no TCM is installed, then the following is displayed:

```
myswitch::configuration cec timing> show
No ESI board found
```

1.6 CES Configuration Command

The **ces** commands let the user create and delete CES connections, as well as display the status of existing connections. You can display the list of available subcommands by typing **?** at the **ces** level.

```
myswitch:: configuration ces> ?
  new              delete           show
```

These commands are not available locally on an LE 155 switch.

1.6.1 Creating a New CES Connection

To create a new CES connection, you must set several parameters. Enter the following to create a new CES connection:

```
myswitch::configuration ces> new <port> <timeslots>
```

The CES **new** command can also be used as shown below. When the following parameters are used, by default, an appropriate entry is made in the UPC table and a bidirectional PVC is created with the proper UPC index.

```
or: new <port> <timeslots> -oport <oport> -ots <ots>
or: new <port> <timeslots> -oport <oport> -ovpi <ovpi> -ovci <ovci>
```

The following advanced options can be used when creating CES connections:

```
advanced options:
[-srts (on|off)] [-fupc <index>] [-bupc <index>]
[-cas (basic|cas)] [-partialfill <partialfill>] [-reassCDVT <cdvt>]
[-bufSize <bufSize>] [-integ <integ>]
```

NOTE

SRTS is only available on unstructured connections, which are created by specifying **all** for the *<timeslots>* parameter.

The **-cas** and **-partialfill** options are not applicable to unstructured mode.

Structured mode is selected by indicating the exact timeslots to be used. For example, timeslots 1, 2, and 3 would be entered as 1-3, timeslots 2, 4, and 6 would be entered as 2:4:6, and combinations such as 1-4:9-11:12 are allowed.

The parameters for new are defined as follows:

Parameter	Description
port	The port on which the CES connection is to be created.
timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are being configured for a particular PVC. **all** indicates unstructured service. The time slot assignments may be either contiguous or non-contiguous DS0s.
oport	The output port of the CES connection, which can be a CES port or an ATM port.
ovpi	The output Virtual Path Identifier (VPI) of the CES connection when the output port is not a CES port.
ovci	The output Virtual Channel Identifier (VCI) of the CES connection when the output port is not a CES port.
ots	The output timeslots of the CES connection when the output port is a CES port.
srts	Indicates whether Synchronous Residual Time Stamp (SRTS) clock recovery is to be enabled on this connection. **on** indicates that SRTS is enabled, **off** indicates that SRTS is disabled. The default is **off**.
-fupc <index>	The UPC contract type to be used in the ingress direction of the connection. (See Section 1.24 in this manual for more information about UPC contracts.)
-bupc <index>	The UPC contract type to be used in the egress direction of the connection. (See Section 1.24 in this manual for more information about UPC contracts.)
cas	Indicates whether Channel Associated Signalling (CAS) is to be used on the connection. **basic** indicates that CAS will not be used, **cas** indicates that CAS will be used. The default is **basic**.
partialfill	Indicates how many of the available 47 payload bytes in each cell are used before they are deemed “full” and ready for transmission across the ATM network (i.e., how much of the ATM cell contains data and how much is filler). The range for this parameter is 5 to 47. The default value is 47, for 47 bytes of data. partialfill is used to minimize network transmission latency and is useful especially with time-sensitive, robbed-bit signalling sources.

Parameter	Description
-reassCDVT <cdvt>	The Cell Delay Variation Tolerance for cells being received by the segmentation and reassembly (SAR) engine. The range for this parameter is 100 to 24000 (in µs), and the default is 2000 (i.e., 2 ms).
bufSize	The amount of reassembly buffer space allocated for the connection. The default is 512 bytes per timeslot.
integ	The amount of time allocated to re-establish the connection before, while, or after the call is established, or in the case of interruption. The default is 2500µs.

1.6.2 Deleting a CES Connection

To delete a CES connection, enter the following parameters:

```
myswitch::configuration ces> delete <service>
```

The parameter for delete is defined as follows:

Parameter	Description
service	The CES service ID of the connection to be deleted.

1.6.3 Displaying CES Connections

To display the current CES connections, enter the following:

```
myswitch::configuration ces> show
Searching For CES ports.....
  CES           Input                              Output
  Service State Port  Timeslots    VPI VCI  Type Port TimeSlots    VPI VCI
  24      down  1A1   1            0   129  -    -    -            -   -
  31      down  1A1   2-3          0   130  spvc 1D3  -            0   32
  32      down  1A1   4-5          0   131  pvc  1D4  -            0   150
  33      down  1A1   6-7          0   132  spvc 1D3  -            0   35
```

The fields in this display are defined as follows:

Field	Description
CES Service	The identification number (assigned by the switch) of this CES connection.
State	Indicates whether the CES connection is enabled (up) or disabled (down).
Input Port	The incoming port on which the CES connection exists.
Timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are configured for the input port. **all** indicates unstructured service.
Input VPI	The incoming VPI value of the connection.
Input VCI	The incoming VCI value of the connection.
Type	The type of ATM connection (i.e., PVC or SPVC) that is associated with the CES connection.
Output Port	The outgoing port on which the CES connection exists.
Timeslots	Indicates which timeslots (1-24 for DS1, 1-31 for E1) are configured for the output port. **all** indicates unstructured service.
Output VPI	The outgoing VPI value of the connection.
Output VCI	The outgoing VCI value of the connection.

To display the advanced settings of the current CES connections, enter the following:

```
myswitch::configuration ces> show advanced
Searching For CES ports.....
                     Service     Clock       Partial     Max         Integ.
Service MapVPI MapVCI Type        Mode  Cas   Fill    BufSize   CDVT Period
2024    0      129    structured  synch basic 0           256    900   2500
```

The fields in this display are defined as follows:

Field	Description
CES Service	The identification number (assigned by the switch) of this CES connection.
MapVPI	The incoming VPI value of the connection.
MapVCI	The incoming VCI value of the connection.
Service Type	Shows if this connection uses structured or unstructured service.
Clock Mode	**Synch** means that the connection is in synchronous mode (either structured or unstructured). **SRTS** means that the connection is in asynchronous (unstructured) mode. (Synchronous Residual Time Stamp (SRTS) clock recovery is enabled on this connection.)
Cas	**basic** indicates that Channel Associated Signalling (CAS) will not be used, **cas** indicates that CAS will be used.
Partial Fill	Indicates how many of the available 47 payload bytes in each cell are used before they are deemed "full" and ready for transmission across the ATM network (i.e., how much of the ATM cell contains data and how much is filler). The range for this parameter is 5 to 47. The default value is 47, for 47 bytes of data. partialfill is used to minimize network transmission latency and is useful especially with time-sensitive, robbed-bit signalling sources.
Max BufSize	The amount of reassembly buffer space allocated for the connection. The default is 512 bytes per timeslot.
CDVT	The Cell Delay Variation Tolerance for cells being received by the segmentation and reassembly (SAR) engine. The range for this parameter is 100 to 24000 (in µs), and the default is 2000 (i.e., 2 ms).
Integ. Period	The amount of time allocated to re-establish the connection before, while, or after the call is established, or in the case of interruption. The default is 2500µs.

If no CES network modules are installed, then the following is displayed:

```
myswitch::configuration ces> show
Searching For CES ports.....
No services found
```

1.7 ILMI SNMP Proxy Configuration Commands

These commands let you configure the ILMI SNMP Proxy (ISP) table. Through this table, you can discover the topology of the network to which your switch is connected because your switch registers its address via ILMI (if ILMI is running on each switch) with its neighboring switches. You can add, delete, or display ISP table entries and you can send SNMP requests to the ISP table. Type **ilmiproxy ?** at the **configuration** level to display the available sub-commands.

```
myswitch::configuration> ilmiproxy ?
  delete           go               new              show
```


1.7.1 Deleting an ISP Table Entry

This command lets you delete an entry from the ISP table. Enter the following parameters:

```
myswitch::configuration ilmiproxy> delete <port> <vpi> <index>
```

For example, to delete an entry from the table, enter something similar to the following:

```
myswitch::configuration ilmiproxy> del 1a2 0 19
```

1.7.2 Resending an ILMI SNMP Proxy Request

This command allows you to resend an ILMI SNMP proxy request. Enter the following parameters:

```
myswitch::configuration ilmiproxy> go <port> <vpi> <index>
```

For example, to resend a request, enter something similar to the following:

```
myswitch::configuration ilmiproxy> go 1a1 0 6
```

1.7.3 Creating an ISP Table Entry

This command lets you create an ISP table entry and send the request. Enter the following parameters:

```
myswitch::configuration ilmiproxy> new <port> <vpi> <index> (get | gnext) <oid> <comm>
(doOnce | doEveryIlmiRestart)
```

Your request will fail if ILMI is down on the path that you entered. First, use the command **conf signalling show** so that you can quickly see on which ports ILMI is up.

For example, before creating an entry, first check on which ports ILMI is up by entering the following:

```
myswitch::configuration signalling> show
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1C1    0 privateUNI(a)  uni30(a)   down  down network
 1C2    0 privateUNI     uni31      up    up   network 172.19.12.140
 1C3    0 PNNI(a)        pnni10(a)  up    up   network 172.19.12.57
 1C4    0 PNNI           pnni10     up    up   network 169.144.64.58
 1CTL   0 privateUNI(a)  uni30(a)   up    down network
```

Then type the parameters to create the entry as follows:

```
myswitch::configuration ilmiproxy> new 1c2 0 get .1.3.6.1.2.1.1.4.0 public doOnce
```

The parameters for delete, go, and new are defined as follows:

Parameter	Description
port	The port number of the ISP table entry.
vpi	The VPI of the ISP table entry.
index	The unique index number of the ISP table entry.
get | getnext	**get** means the SNMP request you are creating is a get, which searches for the object that you are requesting. **gnext** means the SNMP request you are creating is a getnext, which searches for the next greatest entry in the MIB after the object that you specify.
oid	The object identifier (OID) for the SNMP request that you want to get or getnext.
comm	The SNMP community string to use.
doOnce	The SNMP request is to be performed only once.
doEveryIlmiRestart	The SNMP request is to be performed each time that ILMI restarts on the specified path.

1.7.4 Displaying the ISP Table Entries

This command lets you display the current ISP table entries. Enter the following parameters:

```
myswitch::configuration ilmiproxy> show
ISP Entry Port 1A1 Vpi 0 Index 3
------------------------------------------------------------------------
Req_Oid          .1.3.6.1.2.1.1.2.0
Rsp_Oid          .1.3.6.1.2.1.1.2.0
Operation        get
Community        private
When to do       doOnce
Value            OID:.1.3.6.1.4.1.326.2.2
Operation Status success
------------------------------------------------------------------------
ISP Entry Port 1A1 Vpi 0 Index 12
------------------------------------------------------------------------
Req_Oid          .1.3.6.1.4.1.326.2.1.1.1.1.16.0
Rsp_Oid          N/A
Operation        get
Community        private
When to do       doOnce
Value            N/A
Operation Status failure
------------------------------------------------------------------------
ISP Entry Port 1A1 Vpi 0 Index 15
------------------------------------------------------------------------
Req_Oid          .1.3.6.1.2.1.1.1.0
Rsp_Oid          .1.3.6.1.2.1.1.1.0
Operation        get
Community        public
When to do       doOnce
Value            FORE Systems ASX-200BXTNX-210
Operation Status success
------------------------------------------------------------------------
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Req_Oid	The object identifier (OID) for the SNMP request that you sent.
Rsp_Oid	The OID in the response to the SNMP request. It is valid only if the operation status is `success`.
Operation	**`get`** means the SNMP request is a get, which searches for the OID that you requested. **`gnext`** means the SNMP request is a getnext, which searches for the next greatest entry in the MIB after the specified OID.
Community	The SNMP community string being used. The default is public.
When to do	`doOnce` means that the SNMP request is performed only once. `doEveryIlmirestart` means that the SNMP request is to be performed each time that ILMI comes up on the specified path.
Value	The value returned by the get or the getnext. This is valid only if the operation status is `success`
Operation Status	The current status of this SNMP query. **`Idle`** means the request has not been made yet. `inProgress` means the request has been made, but has not been completed yet. **`Success`** means the request has been made and completed successfully. **`Failure`** means the request has been made, but was not successful. Failures can occur because either there was no response from the peer (the request timed out), or there was an error message from the peer (like a NOSUCHNAME error), or the ILMI/UNI/link on which to send this request is down.

You can also display an individual ISP table entry. Enter the following:

```
myswitch::configuration ilmiproxy> show [<port> [<vpi> [<index>]]]
myswitch::configuration ilmiproxy> show 1a1 0 15
ISP Entry Port 1A1 Vpi 0 Index 15
-------------------------------------------------------------------------
Req_Oid          .1.3.6.1.2.1.1.1.0
Rsp_Oid          .1.3.6.1.2.1.1.1.0
Operation        get
Community        public
When to do       doOnce
Value            FORE Systems ASX-200BXTNX-210
Operation Status success
-------------------------------------------------------------------------
```

If there are no current entries in the ISP table, then the following is displayed:

```
myswitch::configuration ilmiproxy> show
ISP information not available
```

1.8 IP Configuration Commands

These commands let you change the IP configuration. You can display the list of available sub-commands by typing **ip ?** at the **configuration** level.

```
myswitch::configuration> ip ?
  address            admin              broadcast          forwarding
  mask               mtu                route>             show
  unconfigure
```


1.8.1 Configuring the IP Address

This command allows you to configure the IP address of each of the switch's IP interfaces. Enter the following parameters:

On a new switch, the ie0, asx0, qaa0, qaa1, qaa2, qaa3 interfaces are NOT configured. An IP address must be configured for at least one of the interfaces to allow IP access to the switch, which, in turn, enables SNMP access. By setting the IP address of the asx0 interface or one of the qaa interfaces, in-band (over ATM) access to the switch control processor (SCP) is enabled. By setting the IP address of the ie0 interface, out-of-band access to the SCP is enabled.

On an ASX-1000 or a TNX-1100, the IP addresses must be configured individually on each SCP.

```
myswitch::configuration ip> address <interface> <address>
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the IP interface to be managed. Valid interfaces are: **ie0** (the Ethernet interface), **asx0** (the switch's SPANS interface), **qaa0**, **qaa1**, **qaa2**, **qaa3** (the Classical IP interfaces), **lo0** (the switch's local interface that allows AMI to run), and **el0**, **el1**,etc. (the LAN Emulation interfaces).
address	The IP address for this interface. The state of the interface must be up before setting the address. This can be changed using **conf ip admin**.

1.8.2 Configuring the IP State

This command allows you to change the state of the IP interface to up or down. Enter the following parameters:

```
myswitch::configuration ip> admin <interface> (up|down)
```

These parameters are defined as follows:

Parameter	Description
interface[1]	The name of the IP interface to be managed. Valid interfaces are: **ie0** and **asx0**.
address	**up** brings the designated interface on-line. **down** takes the interface off-line. If you enter **conf ip admin el all down**, you can bring down all of the **el** interfaces at once. Similarly, entering **conf ip admin el all up** brings up all of the **el** interfaces at once.

1. The switch's local interface, lo0, must always be up to allow AMI to run on the switch.

1.8.3 Configuring the IP Broadcast Address

This command allows you to modify the broadcast address for an IP interface. Enter the following parameters:

```
myswitch::configuration ip> broadcast <interface> (0|1)
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the IP interface to be managed. Valid interfaces are: **ie0**, **asx0**, and any of the **el** interfaces.
0 | 1	The IP broadcast type for this interface. This is the host portion of the IP address that is used for routing. **1** causes the host portion of the IP address to be set to all 1s. **0** causes the host portion of the IP address to be set to all 0s.

1.8.4 Configuring IP Forwarding

This command allows you to turn IP forwarding on or off. If IP forwarding is turned off, the switch will not forward (i.e., route) IP packets from one IP interface to another IP interface. It is generally not necessary to turn IP forwarding off, except for security reasons. Enter the following parameters:

```
myswitch::configuration ip> forwarding (on|off)
```

These parameters are defined as follows:

Parameter	Description
on | off	Using **on** turns IP forwarding on. Using **off** turns IP forwarding off.

1.8.5 Configuring the IP Subnet Mask

This command allows you to modify the IP subnet mask. Enter the following parameters:

```
myswitch::configuration ip> mask <interface> <mask>
```

These parameters are defined as follows:

Parameter	Description
interface	The name of the IP interface. Valid interfaces are: **ie0**, **asx0**, **qaa0**, **qaa1**, **qaa2**, and **qaa3**.
mask	The subnet mask for this IP interface. It should be entered in dotted decimal notation (e.g., 255.255.255.0).

1.8.6 Configuring the MTU Size of a Classical IP Interface

This command allows you to configure the MTU size of a Classical IP interface. Although the default MTU size should work in most installations, you may need to modify this value when connected to non-FORE equipment. Enter the following parameters:

```
myswitch::configuration ip> mtu <qaaX> <size>
```

These parameters are defined as follows:

Parameter	Description
qaaX	The name of the Classical IP interface. Valid interfaces are: **qaa0**, **qaa1**, **qaa2**, and **qaa3**.
size	The MTU size for this Classical IP interface. Valid values are from 1 to 65535. The default is 9180.

1.8.7 Configuring IP Routes

This command allows you to add a static IP route to the local IP routing table, delete a static IP route from the local IP routing table, or list the current static IP routes in the local IP routing table. You can display the list of available subcommands by typing **`route ?`** at the **`ip`** level.

```
myswitch::configuration ip> route ?
new              delete           show
```

1.8.7.1 Adding an IP Route

This command lets you create an IP route. Enter the following parameters:

```
myswitch::configuration ip route> new (default | <destination-ipaddress>) <gateway>
[<metric>] [(host | net)]
```

1.8.7.2 Deleting an IP Route

This command lets you delete an IP route. Enter the following parameters:

```
myswitch::configuration ip route> delete (default | <destination-ipaddress>) <gateway>
```

These parameters for new and delete are defined as follows:

Parameter	Description
default	This parameter must be entered to create a default route.
destination-ipaddress	The destination IP network number.
gateway	The gateway address to the destination IP network number.
metric	The number of hops to the destination IP network. If **1** is specified, the route is created with the RTF_GATEWAY flag set. The default is 1.
host | net	**host** means this is a host-specific route with the destination being a specific node's IP address. **net** means this is a network-specific route with the destination being a network IP address. The default is **net**.

1.8.7.3 Showing the IP Routes

This command lets you display the current IP routes. Enter the following parameters:

```
myswitch::configuration ip route> show
Destination      Gateway              Metric          Interface       Flags
default          169.144.48.1         1               le0             G
169.144.48.0     169.144.48.21        0               le0
169.144.60.0     169.144.60.21        0               asx0
169.144.64.0     169.144.64.21        0               qaa0
169.144.200.0    169.144.200.21       0               el0
169.144.204.0    169.144.204.21       0               el1
169.144.205.0    169.144.205.21       0               el2
169.144.206.0    169.144.206.21       0               el3
```


The fields in this display are defined as follows:

Field	Description
Destination	The destination IP network.
Gateway	The gateway address to the destination IP network number.
Metric	The number of hops to the destination IP network. The default is 1.
Interface	The local IP interface used to get to the destination IP network.
Flags	**H** means the route is host-specific (created with the RTF_HOST flag set). **G** means the route is network-specific (created with the RTF_GATEWAY flag set).

1.8.8 Displaying the IP Interface Configuration

This command allows you to display information about the configuration of the IP interfaces. Enter the following parameters:

```
myswitch::configuration ip> show
interface  state        address          netmask          broadcast          mtu
lo0        up           127.0.0.1        255.0.0.0        N/A                4096
ie0        up           169.144.229.45   255.255.255.0    169.144.229.255    1500
asx0       down
qaa0       up           169.144.230.45   255.255.255.0    N/A                9180
qaa1       down
qaa2       down
qaa3       down

IP Forwarding State: not-forwarding
```

The fields in this display are defined as follows:

Field	Description
interface	The name of the IP interface.
state	The administrative state of the IP interface.
address	The IP address of the IP interface.
netmask	The netmask address of the IP interface.
broadcast	The broadcast address of the IP interface.
mtu	The MTU size of the IP interface. Only the Classical IP interfaces (qaa0, qaa1, qaa2, and qaa3) have a configurable MTU size.

You may also designate a single interface to be displayed by entering **show** and the specific interface name at the prompt as follows:

```
myswitch::configuration ip> show ie0
interface  state        address          netmask          broadcast          mtu
ie0        up           169.144.229.45   255.255.255.0    169.144.229.255    1500

IP Forwarding State: not-forwarding
```

The fields in this display are defined in the same manner as those listed above in the example for showing the configuration of all of the IP interfaces.

1.8.9 Unconfiguring an IP Interface

This command lets you unconfigure an IP interface. This process removes the IP address associated with the interface. Enter the following parameters:

```
myswitch::configuration ip> unconfigure <interface>
```

This parameter is defined as follows:

Parameter	Description
interface	The name of the IP interface to be unconfigured. Valid interfaces are: **ie0**, **asx0**, **qaa0**, **qaa1**, **qaa2**, and **qaa3**.

You will be asked to confirm this action. To confirm the action, type **y** at the prompt. To cancel the action, type **n** or press **<Enter>** at the prompt. For example:

```
myswitch::configuration ip> unconfigure qaa1

Unconfiguring an interface requires the switch to be rebooted.
Continue with unconfigure [n]? y

Reboot the switch [y]? y
```

The switch must be rebooted for this command to take effect.

1.9 LAN Emulation Configuration Commands

These commands allow you to configure LAN Emulation (LANE) on a switch. You can display the list of available subcommands by typing **?** at the **lane** level.

```
myswitch::configuration lane> ?
  default>          bus>              lec>              lecs>
  les>
```

1.9.1 Default LANE Configuration Commands

These commands let you configure a default ELAN. You can display the list of available subcommands by typing **?** at the **default** level.

```
myswitch::configuration lane default> ?
  new               delete            show
```

1.9.1.1 Creating a Default ELAN

This command lets you create a simple default ELAN. You can use this command only if you do not already have an ELAN named `default`. This command creates and starts an ELAN named `default` that consists of an LECS, a co-located LES/BUS, and a single LEC. This ELAN uses the ATM Forum well-known address for the LECS. It is an Ethernet ELAN with an MTU size of 1516, and it has ELAN access control disabled and TLV registration enabled.

You must assign an IP address to the `el0` interface for the LEC using **conf ip address** and then bring it up using **conf ip admin** <*interface*> **up**.

You cannot use DLE with this ELAN unless you delete the ELAN and recreate it using the **conf lane les** command so that you can assign the DLE peer server addresses.

Enter the following parameters:

```
myswitch::configuration lane default> new
Do you want to create default ELAN (LES/BUS, LECS, LEC): [n]? y
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** creates a new ELAN named `default`. If you enter **y**, you receive the following message when the ELAN is created.

```
Created LANE Services and a LEC for the default ELAN.
```

If an ELAN named `default` already exists, you will receive an error message.

1.9.1.2 Deleting a Default ELAN

This command lets you delete the ELAN named `default`. This command will delete the ELAN named `default` that was started using the **`conf lane default new`** command.

If the ELAN named `default` was started using the other **`conf lane`** commands and the `-les` option was specified under **`conf lane lecs new`**, then this command will delete that ELAN named `default`, as well.

Enter the following parameters:

```
myswitch::configuration lane default> delete
Do you really want to delete the ELAN named default (LES/BUS, LECS, LEC): [n]? y
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** deletes the ELAN named `default`. If no ELAN named `default` exists, you receive the following message when you enter **y**.

```
myswitch::configuration lane default> delete
Do you really want to delete the ELAN named default (LES/BUS, LECS, LEC): [n]? y
Default LANE is not configured.
```

1.9.1.3 Displaying a Default ELAN

This command lets you show information for the ELAN named `default`. Enter the following:

```
myswitch::configuration lane default> show
LECS Information:
 Index  AdminStatus  OperStatus   Selector  WKA         Database
     1  up           up              0xf1  atm-forum   lecs.cfg
        Default LES :0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
LES/BUS Information:
 Index AdminStatus OperStatus LesSel Type       MTU   ELAN     SECURE  TLVs
 1     up          up         0xf0   ethernet   1516  default  disable enable
        LES : 0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
        BUS : 0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0 (Co-Located)
LEC Information:
        Admin   Oper
 Index  Status  Status   Sel   Mode       MACaddress    IfName    ELAN
     1  up      down     0x00  wellknown  0620481a3596  el0       default
        LECS:0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        LES :00000000000000000000000000000000000000000000
```

The fields in this display are defined as follows:

Field	Description
LECS Information:	
Index	The unique index number of the LECS that identifies it from other LECSs. This number is dynamically assigned by the switch when the LECS is created.
AdminStatus	Reflects any changes that you have made to the status of the LECS. **up** means you have started the LECS. **down** means you have stopped the LECS.
OperStatus	Reflects the actual current status of the LECS. **up** means the LECS is currently active. **down** means the LECS is currently inactive.
Selector	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the switch that is running the LECS.
WKA	The state of the well-known address for this particular LECS. **atm-forum** means the LECS is using the default address as defined by the ATM Forum. This is the default value. **none** means the well-known address has been disabled. **other** means the well-known address has been redefined, in which case the new address appears on the following line.
Database	The full path to the location and name of the LECS database file. The default is `lecs.cfg`.
Default LES	The default LES address to use in case the LECS configuration file is inaccessible. If a default LES address has not been specified, this field is not displayed.
LES/BUS Information:	
Index	The unique index number of the LES that identifies it from other LESs. This number is dynamically assigned by the switch when the LES is created.

Field	Description
AdminStatus	Reflects any changes that you have made to the status of the LES. **up** means you have started the LES. **down** means you have stopped the LES.
OperStatus	Reflects the actual current status of the LES. **up** means the LES is currently active. **down** means the LES is currently inactive.
LesSel	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the switch that is the LES.
Type	**ethernet** means the LAN type is Ethernet. **token-ring** means the LAN type is Token Ring.
MTU	The maximum data frame size. Can be **1516**, **4544**, **9234**, or **18190**. The default for Ethernet is **1516**. The default for Token Ring is **4544**.
ELAN	The name of the ELAN that this LES services.
SECURE	**enable** means that ELAN access control is running. **disable** means that ELAN access control is not running.
TLVs	**enable** means the LES accepts TLV parameters from LEC / MPCs that register with it and distributes these TLVs to LEC / MPCs in response to LE-ARP queries. **disable** means the LES collects TLV parameters from LEC / MPCs that register with it, but does not distribute these TLVs to LEC / MPCs in response to LE-ARP queries.
LES:	The full ATM address of the LES. The LECs that wish to join this ELAN use this address to contact the LES.
BUS:	The full ATM address of the BUS for this ELAN.
LEC Information:	
Index	The unique index that identifies this LEC. It is dynamically assigned by the switch when the LEC is created.
AdminStatus	Reflects any changes that you have made to the status of the LEC. **up** means you have started the LEC. **down** means you have stopped the LEC.
OperStatus	Reflects the actual current status of the LEC. **up** means the LEC is currently active. **down** means the LEC is currently inactive. **joining** means that the LEC is in the process of registering with the ELAN.
Sel	The selector byte portion (20th byte) of the ATM address of the LEC in hexadecimal format.
Mode	The configuration mode that is used when a LEC joins the ELAN. **wellknown** means that the "well-known" LECS address and the default LES are used. **manual** means that the specified LECS or LES address is used. The default is **wellknown**.
MACaddress	The Ethernet MAC address for this LEC.
IfName	The `el` interface name of this LEC.
ELAN	The name of the ELAN to which this LEC belongs.

If there is no ELAN named `default`, you receive the following message:

```
myswitch::configuration lane default> show
Default LANE is not configured.
```

1.9.2 BUS Configuration Commands

These commands allow you to configure a Broadcast and Unknown Server (BUS) for an ELAN. You can display the list of available subcommands by typing **?** at the **bus** level.

```
myswitch::configuration lane bus> ?
  admin            delete           new              show
```

ForeThought 5.0 and greater versions do not allow you to create a BUS separately from a LES. Therefore, the commands in this menu are only useful in providing backwards compatibility with switches that are running earlier versions of *ForeThought* software.

1.9.2.1 Configuring the BUS Administrative Status

This command lets you change the administrative status of a BUS to up (start a BUS service) or down (stop a BUS service). Enter the following parameters:

```
myswitch::configuration lane bus> admin <BUS index | BUS index range (x-y)> (up | down)
```

1.9.2.2 Deleting a BUS

This command allows you to delete a specified BUS. Enter the following parameters:

```
myswitch::configuration lane bus> delete <BUS index | BUS index range (x-y)>
```

The parameters for admin and delete are defined as follows:

Parameter	Description
BUS index	The unique, positive integer index of the BUS that is dynamically assigned by AMI when a BUS is created to identify this service from any other service in the same class. Found under the `Index` field using the **`conf lane bus show`** command.
BUS index range (x-y)	The range of index numbers of the BUSs that you want to start or stop. The index is found under the `Index` field using **`conf lane bus show`**.
up | down	**up** changes the administrative status of the designated BUS index to up. **down** changes the administrative status of the designated BUS index to down.

1.9.2.3 Creating a BUS

This command lets you create a BUS for an ELAN. Enter the following parameters:

```
myswitch::configuration lane bus> new <BUS Selector byte (HEX)> <BUS name> \
                [-type (ethernet | token-ring)] \
                [-mtu (1516 | 4544 | 9234 | 18190)]
```

The parameters for new are defined as follows:

Parameter	Description
BUS Selector byte	The 20th byte of the ATM address of the switch that is to run a BUS service (entered in hexadecimal format). Use **conf atmarp getnsap** to display the entire ATM address.
BUS name	The name for this BUS. Identifies which ELAN this BUS services.
type	**ethernet** means that the LAN type is Ethernet. **token-ring** means that the LAN type is Token Ring. The default is ethernet.
mtu[1]	Indicates which maximum transmission unit (MTU) size you wish to use. Valid values are: 1516, 4544, 9234, and 18190. Defaults are 1516 for Ethernet and 4544 for Token Ring.

1. The MTU size must match the MTU size of the other hosts and edge devices on the ELAN.

1.9.2.4 Displaying BUS Information

This command lets you display the current BUS information. To display information about every BUS that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane bus> show
 Index  AdminStatus  OperStatus   Selector  Type          MTU  ELAN
     1  up           up               0x12  ethernet     1516  one
     2  up           up               0x32  token-ring   4544  three
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this BUS. It is dynamically assigned by AMI when the BUS is created.
AdminStatus	Reflects any changes that you have made to the status of the BUS. **Up** means you have started the BUS. **Down** means you have stopped the BUS.
OperStatus[1]	Reflects the actual current status of the BUS. **Up** means the BUS is currently active. **Down** means the BUS is currently inactive.
Selector	The selector byte portion (20th byte) of the ATM address of the host or switch that is the BUS in hexadecimal format
Type	The type of ELAN this is. **ethernet** means that the LAN type is Ethernet. **token-ring** means that the LAN type is Token Ring
MTU	The maximum transmission unit (MTU) size.
ELAN	The name of the ELAN that this BUS services.

1. When you change the administrative status of a BUS from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the information above to show the AdminStatus as up, but the OperStatus as down. If you refresh the display, the change will have taken place and be reflected here.

To display information about a particular BUS that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane bus> show [<BUS index>]
```

For example, to display information about the BUS with an index number of 1, enter the following parameters:

```
myswitch::configuration lane bus> show 1
 Index  AdminStatus  OperStatus   Selector  Type          MTU  ELAN
     1  up           up               0x12  ethernet     1516  one
```

The fields in this display are defined in the same manner as those in the previous example.

1.9.3 LAN Emulation Client (LEC) Configuration Commands

These commands let you configure the LAN Emulation Client (LEC). You can display the list of available subcommands by typing **lec ?** at the **lane** level.

```
myswitch::configuration lane> lec ?
  admin            arp>            delete          default>
  new              show
```


1.9.3.1 Configuring the LEC Administrative Status

This command lets you change the administrative status of a LEC to up (start a LEC) or down (stop a LEC). Enter the following parameters:

```
myswitch::configuration lane lec> admin <LEC index | LEC index range (x-y)> (up | down)
```

The parameters for admin are defined as follows:

Parameter	Description
LEC index	The unique, positive integer index of the LEC that is dynamically assigned by AMI when a LEC is created to identify this LEC from any others in the same ELAN. Found under the Index field using the **conf lane lec show** command.
LEC index range (x-y)	The range of index numbers of the LECs that you want to start or stop. The index is found under the Index field using **conf lane lec show**.
up | down	Entering **up** starts this LEC. Entering **down** stops this existing LEC. The default is **up**.

1.9.3.2 Configuring LANE ARP Commands

These commands let you configure the LANE ARP cache. You can reach this level by entering **arp** at the **lec** level. Enter the following parameters to list the various ARP commands:

```
myswitch::configuration lane lec> arp ?
  delete           show
```

1.9.3.2.1 Deleting LANE ARP Cache Information

This command allows you to remove an ARP entry from the LANE ARP cache or to delete the contents of the LANE ARP cache. Enter the following parameters:

```
myswitch::configuration lane lec arp>  delete (all | <MAC address>)
```

These parameters are defined as follows:

Parameter	Description
all	Indicates that all of the entries are to be flushed from the LANE ARP cache.
MAC address	Indicates the specific entry that is to be flushed from the LANE ARP cache.

1.9.3.2.2 Displaying LANE ARP Cache Information

This command displays the current LANE ARP cache. The MAC address-to-ATM address mapping information for each LEC is stored here. Enter the following parameters:

```
myswitch::configuration lane lec arp> show [(advanced)]
```

By entering **show** without the **advanced** option, the basic LANE ARP cache information is displayed as follows:

```
myswitch::configuration lane lec arp> show
 MacAddress   AtmAddress                                          ELAN
 0020481a00d5 0x47.0005.80.ffe100.0000.f21a.00d5.0020481a00d5.0b eng-net
```

By entering **show** with the **advanced** option, more LANE ARP cache information, including the VPI/VCI combination and any flags associated with this entry, is displayed as follows:

```
myswitch::configuration lane lec arp> show advanced
 MacAddress   AtmAddress                                          ELAN
 0020481a00d5 0x47.0005.80.ffe100.0000.f21a.00d5.0020481a00d5.0b eng-net
        vpi=0, vci=82, flags=valid
```

If the LANE ARP cache is empty, then the following message is displayed.

```
No LANE ARP entries are available.
```

1.9.3.3 Deleting a LEC

This command lets you delete a LEC from an ELAN. Enter the following parameters:

```
myswitch::configuration lane lec> delete <LEC index | LEC index range (x-y)>
```

The parameters for delete are defined as follows:

Parameter	Description
LEC index	The unique, positive integer index of the LEC that is dynamically assigned by AMI when a LEC is created to identify this LEC from any others in the same ELAN. Found under the `Index` field using the **`conf lane lec show`** command.
LEC index range (x-y)	The range of index numbers of the LECs that you want to delete. The index is found under the `Index` field using **`conf lane lec show`**.

Before you can delete a LEC, you must first administer its `el` interface down using the **`conf ip admin`** *<interface>* **`down`** command.

1.9.3.4 LEC Default Configuration Mode Commands

These commands allow you to set or to display the default LEC configuration mode. You can show the list of available subcommands by typing **`default ?`** at the **`lec`** level.

```
myswitch::configuration lane lec> default ?
  mode              show
```

1.9.3.4.1 Setting the Default LEC Configuration Mode

This command lets you set the default mode for configuring all of the ELANs that may be created on this switch.

If you use **manual** mode, you must specify the LECS address of the machine that will be used as the LECS. If you use **wellknown** mode, then the "well-known" LECS address is used.

Enter the following parameters:

```
myswitch::configuration lane lec default> mode (manual | wellknown) [<LECS address>]
        LECS address is required for manual mode.
```

These parameters are defined as follows:

Parameter	Description
manual | wellknown	**manual** means the LECS address specified here is used as the LECS address. **wellknown** means that the LEC first uses ILMI to attempt to discover the LECS address. If no address is available via that method, then the LEC attempts to use the ATM Forum's "well-known" LECS address (**47.0079.00.000000.0000.0000.0000.00A03E000001.00**) to contact the LECS. The default is **wellknown**.
LECS address	The ATM address of the LECS to be used instead of the "well-known" LECS.

1.9.3.4.2 Displaying the Default LEC Configuration Mode

This command lets you show whether the default LEC configuration mode is **manual** (using a LECS other than the one at the "well-known" address) or **wellknown** (using the LECS at the "well-known" address). Enter the following parameters:

```
myswitch::configuration lane lec default> show
LEC Default configuration mode: wellknown
```

1.9.3.5 Creating an Ethernet LEC

This command lets you create an Ethernet LEC (join an ELAN). When a LEC is created, a corresponding `el` interface is created. The interface name (`el0`, `el1`, etc.) is assigned based on the selector byte entered when the LEC is created. The list of current `el` interfaces can be displayed using the **`conf lane lec show`** command or the **`conf ip show`** command. The maximum number of LECs that can be created on a switch is 16. Enter the following:

This command only allows you to create an instance of a LEC on a switch. To create a LEC on a host, you must use the *ForeRunner* VLAN Manager or use an *ForeRunner* adapter. Refer to the respective user's manual for more information.

You can only create an Ethernet LEC on a switch. To create a Token Ring LEC, you must use a *ForeRunner* PC adapter. Refer to your respective PC adapter user's manual for more information.

```
myswitch::configuration lane lec> new <LEC Selector byte (HEX)> <ELAN name>
        [-ip <IP Address> [-mask <IP netmask>]]
        [(wellknown | manual)]
        manual mode options: [-lecs <LECS address>] or [-les <LES address>]
```

The parameters for new are defined as follows:

Parameter	Description
LEC Selector byte (HEX)	The 20th byte of the ATM address of the LEC (entered in hexadecimal format). Use the **`conf atmarp getnsap`** command to display the entire ATM address.
ELAN name	The name of the ELAN that this LEC is joining.
ip <IP Address>	The IP address for this el interface. By entering this information here, you will not have to bring up the LEC's el interface separately using **`conf ip admin`** *`<interface>`* **`up`**.
mask <IP netmask>	The optional subnet mask for this el interface that shows the significant part of the address. It should be entered in dotted decimal notation (e.g., 255.255.255.0).

Parameter	Description
wellknown | manual	The configuration mode that is used when this LEC joins the ELAN. **wellknown** means that the LEC first attempts to discover the LECS address using ILMI. If the LEC discovers more than one LECS address, the LEC tries to connect to the LECS in the order that the addresses appear in the list. (This list can be configured using **conf nsap registry new** and displayed using **conf nsap registry show**.) If there are no addresses in this list, then the LEC attempts to contact the LECS using the ATM Forum "well-known" address. **manual** and the **-lecs** option means that the LEC attempts to contact the LECS using the LECS address you specified here. **manual** and the **-les** option means that the LEC bypasses the LECS and directly contacts the LES address specified here. The default is **wellknown**.
-lecs <LECS address>	The LECS address to use instead of the "well-known" LECS address.
-les <LES address>	The LES address to use for this ELAN.

If you create a LEC and then change the NSAP prefix of the switch at a later time, the change is NOT automatically reflected in the LEC's address. You must delete the LEC and recreate it using the new NSAP prefix.

The following is an example of how to create a LEC:

```
myswitch::configuration lane lec> new 0x0 eng-net -ip 169.144.224.222 -mask
255.255.255.0
```

1.9.3.6 Displaying LEC Information

This command lets you display the current LEC information. To display information about all of the LECs that are currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane lec> show
        Admin   Oper
 Index  Status  Status   Sel   Mode       MACaddress    IfName    ELAN
     1  up      up       0x00  wellknown  0220481c10bb  el0       eng-net
        LECS:0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        LES :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.20
```


The fields in this display are defined as follows:

Field	Description
Index	The unique index that identifies this LEC. It is dynamically assigned by the switch when the LEC is created.
Admin Status	Reflects any changes that you have made to the status of the LEC. `Up` means you have started the LEC. `Down` means you have stopped the LEC.
Oper Status[1]	Reflects the actual current status of the LEC. `Up` means the LEC is currently active. `Down` means the LEC is currently inactive. `Joining` means that the LEC is in the process of registering with the ELAN.
Sel	The selector byte portion (20th byte) of the ATM address of the LEC in hexadecimal format.
Mode	The configuration mode that is used when a LEC joins the ELAN. **`wellknown`** means that the LECS address was discovered via ILMI or that ATM Forum well-known address is being used. **`manual`** means that the specified LECS or LES address is used. The default is **`wellknown`**.
MACaddress	The Ethernet MAC address for this LEC.
IfName	The `el` interface name of this LEC.
ELAN	The name of the ELAN to which this LEC belongs.
LECS	The address of the LECS that services the ELAN to which this LEC belongs. If the `Mode` is **`manual`** then no LECS address is displayed because the LEC directly connects to the LES. If the `Mode` is **`wellknown`** then the LECS address is displayed. If the LECS address was discovered via ILMI, then that LECS address is displayed; otherwise, the ATM Forum well-known address is displayed.
LES	The anycast address of the LES that services the ELAN to which this LEC belongs.

1. When you change the administrative status from `down` to `up`, it takes a few seconds for the change to occur and to be reflected in the `OperStatus` field. Therefore, it is possible for the `AdminStatus` to be `up`, but the `OperStatus` to be `down`. If you refresh the display, the change has taken place and is reflected here.

To display information about a particular LEC that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane lec> show [<LEC index>] [(advanced)]
```

For example, to display information about the LEC with an index number of 1, enter the following parameters:

```
myswitch::configuration lane lec> show 1
        Admin   Oper
 Index  Status  Status   Sel   Mode       MACaddress    IfName    ELAN
     1  up      up       0x00  wellknown  0220481c10bb  el0       eng-net
        LECS:0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        LES :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.20
```

The fields in this display are defined in the same manner as those in the previous example.

You can also display advanced information about the LECs. Enter the following parameters:

```
myswitch::configuration lane lec> show advanced
        Admin   Oper
 Index  Status  Status   Sel   Mode       MACaddress    IfName    ELAN
     1  up      up       0x00  wellknown  0220481c10bb  el0       default
        LECS:0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        LES :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.20
        BUS : 47000580ffe1000000f21c10bb0020481c10bb20
        LEC ID : 2                              Discovered ELAN name : elan1
        Configure Direct VCC : 0.71
        Control Direct VCC : 0.125              Control Distribute VCC : 0.75
        Multicast Send VCC : 0.128              Multicast Forward VCC : 0.76
        Last Error : ran out of resources (to LES)
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index that identifies this LEC. It is dynamically assigned by the switch when the LEC is created.
Admin Status	Reflects any changes that you have made to the status of the LEC. Up means you have started the LEC. Down means you have stopped the LEC.

Field	Description
Oper Status[1]	Reflects the actual current status of the LEC. `Up` means the LEC is currently active. `Down` means the LEC is currently inactive. `Joining` means that the LEC is in the process of registering with the ELAN.
Sel	The selector byte portion (20th byte) of the ATM address of the LEC in hexadecimal format.
Mode	The configuration mode that is used when a LEC joins the ELAN. **`wellknown`** means that the LECS address was discovered via ILMI or that ATM Forum well-known address is being used. **`manual`** means that the specified LECS or LES address is used. The default is **`wellknown`**.
MACaddress	The Ethernet MAC address for this LEC.
IfName	The `el` interface name of this LEC.
ELAN	The name of the ELAN to which this LEC belongs.
LECS	The address of the LECS that services the ELAN to which this LEC belongs. If the `Mode` is **`manual`** then no LECS address is displayed because the LEC directly connects to the LES. If the `Mode` is **`wellknown`** then the LECS address is displayed. If the LECS address was discovered via ILMI, then that LECS address is displayed; otherwise, the ATM Forum well-known address is displayed.
LES	The anycast address of the LES that services the ELAN to which this LEC belongs.
BUS	The address of the BUS that services the ELAN to which this LEC belongs.
LEC ID	The unique ID that the LES gives the LEC when it joins the ELAN.
Discovered ELAN Name	The ELAN name returned to the LEC by the LES when it joins the ELAN.
Configure Direct VCC	A temporary bidirectional point-to-point VCC set up by the LEC to the LECS.
Control Direct VCC	A bidirectional point-to-point VCC set up by the LEC to the LES.
Control Distribute VCC	A unidirectional point-to-multipoint VCC set up by the LES to the LECs in the ELAN.
Multicast Send VCC	A bidirectional point-to-point VCC set up by the LEC to the BUS for sending multicast data to the BUS.
Multicast Forward VCC	A unidirectional point-to-multipoint VCC set up from the BUS to the LECs in the ELAN.
Last Error	The last error experienced by this LEC, if applicable. This field is reset when the switch is rebooted.

1. When you change the administrative status from `down` to `up`, it takes a few seconds for the change to occur and to be reflected in the `OperStatus` field. Therefore, it is possible for the `AdminStatus` to be `up`, but the `OperStatus` to be `down`. If you refresh the display, the change has taken place and is reflected here.

1.9.4 LAN Emulation Configuration Server (LECS) Commands

These commands allow you to configure the LAN Emulation Configuration Server (LECS). You can display the list of available subcommands by typing **lecs ?** at the **lane** level.

```
myswitch::configuration lane> lecs ?
  admin            delete           new              show
  get
```

1.9.4.1 Configuring the LECS Administrative Status

This command lets you change the administrative status of the LECS to up (start a LECS service) or down (stop a LECS service). Enter the following parameters:

```
myswitch::configuration lane lecs> admin <LECS index | LECS index range (x-y)> (up | down)
```

1.9.4.2 Deleting a LECS

This command lets you delete (stop) a specified LECS service. Enter the following parameters:

```
myswitch::configuration lane lecs> delete <LECS index | LECS index range (x-y)>
```

The parameters for admin and delete are defined as follows:

Parameter	Description
LECS index	The unique integer index of the LECS that is dynamically assigned by AMI when a LECS is created to identify this service from any other service in the same class. Found under the Index field using the **conf lane lecs show** command.
LECS index range (x-y)	The range of index numbers of the LECSs that you want to start or stop. The index is found under the Index field using **conf lane lecs show**.
up | down	**up** changes the administrative status of the designated LECS index to up. **down** changes the administrative status of the designated LECS index to down.

1.9.4.3 Creating a LECS

This command lets you create (start) a LECS service. Enter the following parameters:

```
myswitch::configurat lane lecs> new <LECS Selector byte (HEX)> [-db <LECS database file>]
        [-default <LES atm address>] [<LECS-wka> | none]
```

The parameters for new are defined as follows:

Parameter	Description
LECS Selector byte (HEX)	The 20th byte of the ATM address of the host or switch that is to run a LECS service (entered in hexadecimal format). Use the **conf atmarp getnsap** command to display the entire ATM address.
-db <LECS database file>	The full path to the location and name of the LECS database file. The default file is `lecs.cfg`. For information about configuring this file, refer to the Network Configuration manual for your switch.
-default <LES atm address>	The default LES address to use in case the LECS configuration file is inaccessible.
<LECS-wka> | none	**none** means the well-known address is disabled so that the LECS can only be contacted by using the switch's actual address (with selector byte). **LECS-wka** means that the ATM address that you enter is going to be used as the well-known address instead of the one defined by the ATM Forum.

Although more than one LECS can be created on a switch, you must ensure that no two LECS are listening on the same address.

If you create a LECS and then change the NSAP prefix of the switch at a later time, the change is NOT automatically reflected in the LECS's address. You must delete the LECS and recreate it using the new NSAP prefix.

1.9.4.4 Displaying LECS Information

This command lets you display the current LECS information. To display information about the current LECS configuration on the switch, enter the following parameters:

```
myswitch::configuration lane lecs> show
 Index  AdminStatus  OperStatus   Selector  WKA         Database
     1  up           up              0x01  atm-forum   lecs.cfg
        Default LES :0x47.0005.80.ffe100.0000.f215.096b.00204815096b.a2
     2  up           up              0x02  none        lecs.cfg
     3  up           up              0x03  other       lecs.cfg
        wka: 0x47.0005.80.ffe100.0000.f215.11f1.0020481511f8.99
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number of the LECS that identifies it from other LECSs. This number is dynamically assigned by the switch when the LECS is created.
AdminStatus	Reflects any changes that you have made to the status of the LECS. **up** means you have started the LECS. **down** means you have stopped the LECS.
OperStatus[1]	Reflects the actual current status of the LECS. **up** means the LECS is currently active. **down** means the LECS is currently inactive.
Selector	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the host or switch that is running the LECS.
WKA	The state of the well-known address for this particular LECS. **atm-forum** means the LECS is using the default address as defined by the ATM Forum. **none** means the well-known address has been disabled. **other** means the well-known address has been redefined, in which case the new address appears on the following line.
Database	The full path to the location and name of the LECS database file. The default file is `lecs.cfg`.
Default LES	The default LES address to use in case the LECS configuration file is inaccessible. If a default LES address has not been specified, this field is not displayed.

1. When you change the administrative status from down to up, it takes a few seconds for the change to occur and to be reflected in the `OperStatus` field. Therefore, it is possible for the `AdminStatus` to be up, but the `OperStatus` to be down. If you refresh the display, the change has taken place and is reflected here.

To display information about a particular LECS that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane lecs> show [<LECS index>]
```

For example, to display information about the LECS with an index number of 1, enter the following parameters:

```
myswitch::configuration lane lecs> show 1
 Index  AdminStatus  OperStatus   Selector  WKA         Database
     1  up           up              0x01  atm-forum   lecs.cfg
        Default LES :0x47.0005.80.ffe100.0000.f215.096b.00204815096b.a2
```

The fields in this display are defined in the same manner as those listed above in the example for all of the LECS configured on the switch.

If there is an error in the LECS.CFG file that prevents the LECS from starting, an error is printed to the console (if the console is enabled) indicating the line number in which the error occurred.

1.9.4.5 Getting the LECS Configuration File

This command lets you download the LECS configuration file. Enter the following:

```
myswitch::configuration lane lecs> get <host>:<remotefile> [<localfile>]
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host from which the LECS database file is to be retrieved.
remotefile	The name of the LECS database file that is to be retrieved.
localfile[1]	The name of the file where the retrieved LECS database file is to be stored.

1. The default local file is `lecs.cfg`.

For information about configuring this file, refer to the Network Configuration manual for your switch.

If you have configured the transfer protocol to be FTP using **`conf system protocol`**, you only need to enter the command shown above to retrieve the LECS file. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file. For information about the **`conf system protocol`** command, refer to Section 1.21.4 in this manual.

If you have configured the transfer protocol to be TFTP (this is the default) using **`conf system protocol`**, the remote host from which the LECS file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see Installation and Maintenance manual for your switch.

1.9.5 LAN Emulation Server (LES) Configuration Commands

These commands allow you to configure the LAN Emulation Server (LES). You can display the list of available subcommands by typing **les ?** at the **lane** level.

```
myswitch::configuration lane> les ?
  admin             delete            new               peeradd
  peerdelete        security          show
```


1.9.5.1 Configuring the LES Administrative Status

This command lets you change the administrative status of the LES to up (start a LES service) or down (stop a LES service). Enter the following parameters:

```
myswitch::configuration lane les> admin <LES index | LES index range (x-y)> (up | down)
```

1.9.5.2 Deleting a LES

This command lets you delete a specified LES. Enter the following parameters:

```
myswitch::configuration lane les> delete <LES index | LES index range (x-y)>
```

The parameters for admin and delete are defined as follows:

Parameter	Description
LES index	The unique integer index of the LES that is dynamically assigned by AMI when a LES is created to identify this service from any other service in the same class. Found under the Index field using the **conf lane les show** command.
LES index range (x-y)	The range of index numbers of the LES that you want to start or stop. The index is found under the Index field using **conf lane les show**.
up | down	**up** changes the administrative status of the designated LES index to up. **down** changes the administrative status of the designated LES index to down.

1.9.5.3 Creating a LES

This command lets you create a new LES. Enter the following parameters:

```
myswitch::configuration lane les> new <LES Selector Byte (HEX)> <LES name> \
                [-bus <BUS Selector Byte (HEX)>] \
                [-type (ethernet | token-ring)] \
                [-mtu (1516 | 4544 | 9234 | 18190)] \
                [-secure wka | <LECS ATM Address>] \
                [-registertlvs (enable | disable)] \
                [-anycast <LES Anycast ATM Address>] \
                [-peers <atm-addr> ...]
```

The parameters for new are defined as follows:

Parameter	Description
LES Selector Byte (HEX)	The 20th byte of the ATM address of the switch that is to run a LES service (entered in hexadecimal format). This command starts a co-located BUS, which means that the LES and BUS services for a particular ELAN are running on the same switch. You cannot create a BUS separately. By default, the LES and BUS will use the same selector byte.
BUS Selector Byte (HEX)	The 20th byte of the ATM address of the BUS associated with this LES. Use this option only if you need to have the BUS use a different selector byte than the LES.
LES name	The user-defined name that helps you to remember what ELAN this LES services.
-type (ethernet | token-ring)	**ethernet** means the LAN type is Ethernet. **token-ring** means the LAN type is Token Ring. The default is **ethernet**.
-mtu (1516 | 4544 | 9234 | 18190)	The length (in number of bytes) of the largest frame field (or MTU size). The default for Ethernet is **1516**. The default for Token Ring is **4544**. The MTU size must match that of the other hosts and edge devices on the ELAN.
-secure wka | <LECS ATM Address>	Indicates you want to activate ELAN access control. If you enter **wka**, the ATM Forum well-known address is used when running with ELAN access control enabled. In this case, you do not have to type the actual well-known address. If you are using an LECS address that is different than the well-known address, then you must type the full LECS ATM address to be used when running with ELAN access control enabled. ELAN access control is disabled by default.
-registertlvs (enable | disable)	**enable** means the LES supports MPOA operation by accepting flow descriptors from LANE / MPOA clients (LEC / MPCs) that register with it and distributing these flow descriptors to LEC / MPCs in response to LE-ARP queries. **disable** means the LES collects flow descriptors parameters from LEC / MPCs that register with it, but does not distribute these flow descriptors to LEC / MPCs in response to LE-ARP queries. The default is **enable**.
-anycast <LES Anycast ATM Address>	The unique anycast ATM address that all LECs in a given ELAN use to connect to one of the Distributed LAN Emulation (DLE) servers for that ELAN. If this option is not used, then the LES address is used, meaning that this is a stand-alone LES / BUS pair (i.e., DLE services are not running). The anycast address must be unique within the first 19 bytes. Anycast addresses cannot be all zeros and the first 19 bytes cannot be all zeros.

Parameter	Description
-peers <atm-addr>	The unique ATM address(es) of this DLE server's peer(s). It is through these addresses that all servers in a DLE ELAN connect to and communicate with each other. You must explicitly enter the local LES ATM address in the list of DLE peers. It does not matter in which order the local address appears in the list.

If you create a LES and then change the NSAP prefix of the switch at a later time, the change is NOT automatically reflected in the LES's address. You must delete the LES and recreate it using the new NSAP prefix. If you are using DLE, you must also change the LES's address in the lists of all of the other DLE peers.

1.9.5.4 Adding a DLE Peer

This command lets you add a DLE peer server to the list of DLE peer servers for an existing DLE ELAN without destroying and recreating the existing peers. Enter the following:

```
myswitch::configuration lane les> peeradd <LES index> <Peer ATM Address>
```

These parameters are defined as follows:

Parameter	Description
LES index	The index number of the LES that you want to add to the list of DLE peer servers for a particular ELAN. This index number is dynamically assigned by the switch when the LES is created. It can be found under the `Index` field using the **`conf lane les show`** command.
Peer <ATM Address>	The unique ATM address of the DLE peer server you want to add. It is through this address that all of the DLE peer servers in a DLE ELAN connect to and communicate with each other.

When using this command, the LES must already exist and the ELAN that it services must be a DLE ELAN.

The LES is temporarily administered down while it is being added to the list of peers and comes back up once the process is complete. Because of this, a warning is shown when you issue this command and you are asked if you want to continue. For example:

```
myswitch::configuration lane les> peeradd 1
0x47.0005.80.ffe100.0000.f21a.23c0.0020481a23c0.75

WARNING: This command will disable the LES service for the
duration of execution. Full ELAN connectivity may not be restored
until all the LANE clients reconnect to the LES service

Do you want to continue [n]? y
```

Type **n** or **<ENTER>** to abort the command or type **y** to continue adding the peer.

1.9.5.5 Deleting a DLE Peer

This command lets you delete a DLE peer server from the list of DLE peer servers for an existing ELAN without destroying and recreating the existing peers. Enter the following:

```
myswitch::configuration lane les> peerdelete <LES index> <Peer ATM Address>
```

These parameters are defined as follows:

Parameter	Description
LES index	The index number of the LES that you want to delete from the list of DLE peer servers for a particular ELAN. This index number is dynamically assigned by the switch when the LES is created. It can be found under the `Index` field using the **`conf lane les show`** command.
Peer <ATM Address>	The unique ATM address of the DLE peer server you want to delete. It is through this address that all of the DLE peer servers in a DLE ELAN connect to and communicate with each other.

When using this command, the LES must already exist and the ELAN that it services must be a DLE ELAN.

The LES is temporarily administered down while it is being deleted from the list of peers and comes back up once the process is complete. Because of this, a warning is shown when you issue this command and you are asked if you want to continue. For example:

```
myswitch::configuration lane les> peerdelete 2
0x47.0005.80.ffe100.0000.f21a.23c0.0020481a23c0.65

WARNING: This command will disable the LES service for the
duration of execution. Full ELAN connectivity may not be restored
until all the LANE clients reconnect to the LES service

Do you want to continue deleting the peer [n]? y
```

Type **n** or **<ENTER>** to abort the command or type **y** to continue deleting the peer.

The local DLE peer server address cannot be deleted using this command.

1.9.5.6 Enabling/Disabling ELAN Access Control

This command lets you enable or disable ELAN access control for an existing ELAN without destroying and recreating the LES. (For more information about ELAN access control, see the Network Configuration manual for your switch.) Enter the following:

```
myswitch::configuration lane les> security <LES index> (disable|enable) [<wka|LECS Addr>]
        LECS address required for enabling security
```

These parameters are defined as follows:

Parameter	Description
disable | enable	**disable** means that you want to de-activate ELAN access control on this LES. **enable** means that you want to activate ELAN access control on this LES.
wka | LECS Addr	You must enter one of these parameters if you want to enable ELAN access control. If you enter **wka**, the ATM Forum well-known address is used when running with ELAN access control enabled. In this case, you do not have to type in the actual well-known address, just enter **wka**. If you are using an LECS address that is different than the well-known address, then you must type the full LECS ATM address to be used when running with ELAN access control enabled.

When using this command, the LES must already exist.

The LES is temporarily administered down while ELAN access control is being enabled or disabled and comes back up once the process is complete. Because of this, a warning is shown when you issue this command and you are asked if you want to continue. For example:

```
myswitch::configuration lane les> security 2 enable
0x47.0005.80.ffe100.00005.f21a.23c0.00200481a23c0.00

WARNING: This command will disable the LES service for the
duration of execution. Full ELAN connectivity may not be restored
until all the LANE clients reconnect to the LES service

Do you want to continue deleting the peer [n]? y
```

Type **n** or **<ENTER>** to abort the command or type **y** to continue the process.

1.9.5.7 Displaying LES Information

This command lets you display the current LES information. To display information about every LES that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane les> show
 Index AdminStatus OperStatus LesSel Type       MTU   ELAN     SECURE  TLVs
 1     up          up         0x10   ethernet   1516  default  disable enable
        LES    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481a42bb.10
        BUS    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481a42bb.10 (Co-Located)
 2     up          up         0x50   ethernet   1516  eng      enable  disable
        LES    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
        BUS    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50 (Co-Located)
               :c5000580ffe1000000f21c10bb0020481c10bb10 (ANYCAST)
        LECS   :0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        PEER   :0x47.0005.80.ffe100.0000.f21c.10bb.0020482a55a0.70
 3     up          up         0x90   ethernet   1516  mktg     disable enable
        LES    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c16bb.90
        BUS    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c16bb.90 (Co-Located)
               :c5000580ffe1000000f21c10bb0020481c10bb66 (ANYCAST)
        PEER   :0x47.0005.80.ffe100.0000.f21a.24aa.0020481a6754.33
        PEER   :0x47.0005.80.ffe100.0000.f21c.26bb.0020481b4852.44
        PEER   :0x47.0005.80.ffe100.0000.f21c.32bb.0020481c6940.50
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number of the LES that identifies it from other LESs. This number is dynamically assigned by the switch when the LES is created.
AdminStatus	Reflects any changes that you have made to the status of the LES. **up** means you have started the LES. **down** means you have stopped the LES.
OperStatus[1]	Reflects the actual current status of the LES. **up** means the LES is currently active. **down** means the LES is currently inactive.
LesSel	The selector byte portion (20th byte) of the ATM address, in hexadecimal format, of the host or switch that is the LES. This address is used by the peers of this DLE server when they need to contact it.
Type	Shows what type of ELAN this is. **ethernet** means that the LAN type is Ethernet. **token-ring** means that the LAN type is Token Ring.
MTU	The maximum data frame size. Can be **1516**, **4544**, **9234**, or **18190**. The default for Ethernet is **1516**. The default for Token Ring is **4544**.
ELAN	The name of the ELAN that this LES serves.

Field	Description
SECURE	**enable** means that ELAN access control is running. **disable** means that ELAN access control is not running.
TLVs	**enable** means the LES accepts TLV parameters from LEC / MPCs that register with it and distributes these TLVs to LEC / MPCs in response to LE-ARP queries. **disable** means the LES collects TLV parameters from LEC / MPCs that register with it, but does not distribute these TLVs to LEC / MPCs in response to LE-ARP queries.
LES	The full ATM address of the LES, which the DLE peers use to connect to this server. (If DLE is not running, then the LECs that wish to join the ELAN use this address to contact the LES.)
BUS	The full ATM address of the BUS for the ELAN.
(ANYCAST)	The unique anycast ATM address that all LECs in a given ELAN use to connect to one of the DLE servers for that ELAN. If no address is provided by the user, then this is a stand-alone LES / BUS pair (i.e., DLE services are not running in that ELAN).
LECS	The LECS address. This address is displayed only if ELAN access control has been enabled.
PEER	If there are any DLE peer servers, shows the full ATM address of each.

1. When you change the administrative status from down to up, it takes a few seconds for the change to occur and to be reflected in the OperStatus field. Therefore, it is possible for the AdminStatus to be up, but the OperStatus to be down. If you refresh the display, the change has taken place and is reflected here.

To display information about a particular LES that is currently configured on the switch, enter the following parameters:

```
myswitch::configuration lane les> show [<LES index>] [(advanced)]
```

For example, to show information about the LES with an index number of 2, enter the following:

```
myswitch::configuration lane les> show 2
 Index AdminStatus OperStatus LesSel Type       MTU   ELAN     SECURE  TLVs
 2     up          up         0x50   ethernet   1516  eng      enable  disable
        LES    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
        BUS    :0x47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50 (Co-Located)
               :c5000580ffe1000000f21c10bb0020481c10bb10 (ANYCAST)
        LECS   :0x47.0079.00.000000.0000.0000.0000.00a03e000001.00
        PEER   :0x47.0005.80.ffe100.0000.f21c.10bb.0020482a55a0.70
```

The fields in this display are defined in the same way as those listed in the previous example.

Enter the following parameters to display advanced information about every LES that is currently configured on the switch. Information similar to the following is displayed when DLE is running:

```
myswitch::configuration lane les> show advanced
ELAN Name: “eng”
  LES:     47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
           c5.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.10 (anycast)
           Point-to-Multipoint VCC to Peers: 0.714
  BUS:     47.0005.80.ffe100.0000.f21c.10bb.0020481c10bb.50
  Peer #1: 47.0005.80.ffe100.0000.f21a.3552.0020481a3552.10
           Point-to-Point VCC to Peer: 0.713
           Point-to-Multipoint VCC from Peer: 0.61
  LAN Type: Ethernet/IEEE 802.3     Maximum Data Frame Size: 18190
  Non-proxy Control Distribute VCC: 0.716
      Proxy Control Distribute VCC: -.-
             Multicast Forward VCC: 0.718
  Number of local clients: 4
LEC #1 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00 (non-proxy)
  00-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00
  Control Direct VCC: 0.715
LEC #2 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01 (non-proxy)
  02-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01
  Control Direct VCC: 0.719
LEC #3 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02 (non-proxy)
  06-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02
  Control Direct VCC: 0.721
LEC #4 at 47.0005.80.ffe100.0000.f21a.341a.0020481a341a.00 (non-proxy)
  00-20-48-1a-34-1a -> 47.0005.80.ffe100.0000.f21a.341a.0020481a341a.00
  Control Direct VCC: 0.724
```

The fields in this display are defined as follows:

Field	Description
ELAN Name	The names of any ELANs associated with this switch.
LES	When DLE is configured, the first ATM address displayed is the LES unicast address that is used by the other DLE peer servers to connect to this server. The second is the LES anycast address that is used by LECs to connect to the ELAN. (All DLE peer servers in an ELAN must use the same anycast address.) The Point-to-Multipoint VCC to Peers is the VCC on which packets are transmitted by this LES when they are flooded to all of the DLE peer servers. When DLE is not configured, only the single ATM address of the LES that services this particular ELAN is displayed.
BUS	The ATM address of the BUS that services the LECs that are directly connected to this DLE peer server.

Field	Description
Peer #1	The address of one of the DLE peer servers. This is the address at which the LES tries to connect to this DLE peer server. The Point-to-Point VCC to Peer is the VCC that is used to send or receive packets to or from this particular DLE peer server. The Point-to-Multipoint VCC from Peer is the VCC on which packets are received by the LES from this DLE peer server when they are flooded to all of the DLE peer servers.
LAN Type	The type of emulated LAN. Can be either `Ethernet/IEEE 802.3` or `TokenRing/IEEE 802.5`.
Maximum Data Frame Size	The length (in bytes) of the largest frame field. Can be **1516**, **4544**, **9234**, or **18190**.
Non-proxy Control Distribute VCC	The point-to-multipoint connection that the LES maintains to all of the non-proxy LECs that it services.
Proxy Control Distribute VCC	The point-to-multipoint connection that the LES maintains to all of the proxy LECs that it services. This entry is blank if no proxy LECs have joined this ELAN.
Multicast Forward VCC	The VCC on which the BUS forwards broadcast and multicast traffic to all the LECs.
Number of local clients	This is the number of clients connected to this server.
LEC	The LEC ATM address, shows the MAC-to-ATM address mapping for each LEC in this ELAN, and shows whether or not this LEC is a proxy.
Control Direct VCC	The point-to-point connection that the LES maintains to this particular LEC.

Enter the following parameters to display advanced information about each LES that is currently configured on the switch. Information similar to the following is displayed when DLE is not running:

```
myswitch::configuration lane les> show advanced
ELAN Name: “eng”
  LES:     47.0005.80.ffe100.0000.f21a.341a.0020481a341a.20
  BUS:     47.0005.80.ffe100.0000.f21a.341a.0020481a341a.20
  LAN Type: Ethernet/IEEE 802.3     Maximum Data Frame Size: 1516
  Non-proxy Control Distribute VCC: 0.728
      Proxy Control Distribute VCC: -.-
             Multicast Forward VCC: 0.730
  Number of local clients: 3
LEC #1 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00 (non-proxy)
  00-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.00
  Control Direct VCC: 0.727
LEC #2 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01 (non-proxy)
  02-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.01
  Control Direct VCC: 0.731
LEC #3 at 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02 (non-proxy)
  06-20-48-10-13-f2 -> 47.0005.80.ffe100.0000.f21a.341a.0020481013f2.02
  Control Direct VCC: 0.733
```

1.10 Network Module Configuration Commands

These commands let you configure the network modules in your switch fabric. The list of available subcommands is displayed by typing **module ?** at the **configuration** level.

```
myswitch::configuration> module ?
  admin            reset            show             traffic>
```


1.10.1 Configuring the State of a Network Module

This command allows you to change the state of a network module up or down. This command should only be used when you want to test the network module. Enter the following parameters:

```
myswitch::configuration module> admin <module> (up | down)
```

These parameters are defined as follows:

Parameter	Description
module	The network module that is to be started or stopped.
up | down	**up** brings that network module back on-line. **down** causes the designated network module to be be taken off-line temporarily so that it can be tested.

When the **conf module admin** *<module>* **down** command is entered, a warning message is displayed as follows:

```
myswitch::configuration module> admin 2B down
Disabling the network module will destroy all existing connections
going through it.
Disable the network module [n]?
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** tears down all of the existing connections and temporarily places the network module out of service.

To place the module back into service, use the command **conf module admin** *<module>* **up**. At that point, PVCs that are stored in the configuration database are re-established and SVCs are dynamically re-established.

1.10.2 Resetting a Network Module

This command is the software equivalent of removing and immediately re-inserting a network module while the switch is under power. This allows you to reset the connections on a given network module without having physical access to the switch. Enter the following parameters:

```
myswitch::configuration module> reset <module>
```

This parameter is defined as follows:

Parameter	Description
module	The network module you want to reset.

All SVCs associated with this network module are torn down upon a reset and attempt to reconnect as needed. All PVCs associated with this network module are torn down and set up again upon a reset. Depending on the number of PVCs involved, it may take a few seconds for all of the PVCs to be re-established after a reset.

For example, if you want to reset network module 3B, enter the following:

```
myswitch::configuration module> reset 3b
```

The switch then cautions you that all connections will be torn down. To abort the reset, type **n** or press **<ENTER>**. To continue with the reset, type **y**.

```
Resetting the network module will destroy the
existing connections temporarily.
Reset the network module [n]? y
```

1.10.3 Displaying Network Module Configuration Information

This command lets you display general information about network modules that are currently installed in a switch fabric. Enter the following parameters:

```
myswitch::configuration module> show
Module Series Admin  Speed Ports Timing Rev. Serial#  ProductNumber
1C     C      up     100.0   6   no     1.0  N/A      NM-6/100MMSCC
1D     C      up     155.0   4   yes    1.1  N/A      NM-4/155MMSCC
```


The fields in this display are defined as follows:

Field	Description
Module	Shows each network module currently installed in the switch fabric. 1 means that it is the switch fabric in slot 1. The letter shows the position of the network module in the switch fabric. E is the intra-fabric port to the other switch fabrics in an ASX-1000 or a TNX-1100 chassis.
Series	The hardware series of the network module. **C** is a Series C module. **LC** is a Series LC module. **C2** is a circuit emulation services (CES) module. **LE** is an interface on an LE 155 switch. **D** is a Series D module.
Admin	**up** means this module is on-line. **down** means this module has been taken off-line.
Speed	The speed in Mbps of the ports.
Ports	The number of ports on the network module.
Timing	**yes** means this network module supports distributed timing and **no** means that it does not.
Rev.	The hardware revision level of this network module.
Serial #[1]	The serial number of this network module.
Product Number	The FORE Systems product number for this module. **NM** is network module, **CE** is circuit emulation, **BPB** is the ASX-1000 or TNX-1100 intra-fabric module.

1. This field is only available for Series D modules.

1.10.4 Configuring Traffic on a Network Module

These commands enable you to configure or to display information about the traffic on the network modules. To list the available subcommands, type **traffic ?** at the **module** level.

```
myswitch::configuration module> traffic ?
  c>              lc>             le>             d>
```

1.10.4.1 Configuring Traffic on a Series C Network Module

These commands let you configure or display information about the traffic on Series C network modules. To list the available subcommands, type **c ?** at the **traffic** level.

```
myswitch::configuration module traffic> c ?
  epd             fifoblock       models          setmodel
  show
```

1.10.4.1.1 Setting Early Packet Discard on a Series C Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) on a specified network module. This is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 frames that arrive when the shared buffer is over this threshold are discarded in whole. Enter the following parameters:

```
myswitch::configuration module traffic c> epd <module> <number of cells>
```

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured for Early Packet Discard.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. By default, this value is set to 90% of the shared buffer size.

1.10.4.2 Setting FIFO Blocking on a Series C Network Module

This command lets you set FIFO blocking on a specific network module. FIFO blocking enables buffering on the fabric when the network module buffers are full. Enter the following parameters:

```
myswitch::conf module traffic c> fifoblock <module> (normal | enabled)
```

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured for FIFO blocking.
normal | enabled	**normal** means that the network module passes traffic normally. **enabled** means that FIFO blocking takes place on the network module when the buffers are full. The default is **normal**.

1.10.4.3 Displaying Traffic Models for a Series C Network Module

This command allows you to display the different types of traffic memory models on a network module. Enter the following parameters:

```
myswitch::configuration module traffic c> models
 Model  Memory Ucasts Mcasts  MOuts  Cells  Name
 1       32Kx48   4096    512   1024   2048  default
 2      128Kx48   6144    512   1024  12288  default
 3      128Kx48  11264   1024   2048  10240  more conns
 5      128Kx48   2048   2048  16384   8192  VP shaping
 6      128Kx48   3072    128   1024  13312  more cells
 7       32Kx48   2048    256   1024   2560  more cells
```

The fields in this display are defined as follows:

Field	Description
Model[1]	The shared memory model for this configuration. This is the number to enter for the *<model>* parameter when using the **conf module traffic c setmodel** command.
Memory	The size of this shared memory configuration, in bytes.
Ucasts[2]	The maximum number of unicast connections supported for this model. Half of these connections are reserved for low-priority connections (ABR, UBR) and half are reserved for high-priority connections (VBR, CBR). For example, if a model supports 4K unicast connections, it really supports 2K VBR or CBR connections and 2K ABR or UBR connections.

Field	Description
Mcasts	The number of input multicast connections supported from the switch fabric to the network module for this shared memory model. Half of these connections are reserved for low-priority connections (ABR, UBR) and half are reserved for high-priority connections (VBR, CBR). A multicast connection can have multiple outputs on the same network module. The number of outputs does not figure into this constraint.
MOuts	The number of output multicast connections supported from the network module to the link for this shared memory model. Any multicast connection can have multiple outputs on the same network module or the same port. If one multicast connection has four outputs, it requires 1 mcast and 4 mouts. Adding an output to a multicast connection can fail if all of the outputs are in use. Adding the multicast connection might not fail.
Cells	The total amount of cell buffering that is supported for this shared memory model.
Name	The identifier for this shared memory model.

1. Memory model 4 has been removed.
2. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.10.4.4 Setting Traffic Models on a Series C Network Module

This command lets you select one of the traffic memory models for a specific network module. Enter the following parameters:

```
myswitch::configuration module traffic c> setmodel <module> <model>
```

These parameters are defined as follows:

Parameter	Description
module[1]	The network module to be configured.
model[2]	The predefined memory model to be used for this network module. The models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections. Enter the number found in the `Model` field of the **`conf module traffic c models`** command for the shared memory configuration that you want to use.

1. The following Series C network modules can only use the following traffic memory models: NM-6/25UTPEC and NM-4/155UTP5EC can only use models 1 and 7; all other Series C network modules can only use models 2 - 6.
2. The network module must be reset for this command to take effect.

1.10.4.5 Displaying Traffic on a Series C Network Module

This command enables you to display traffic model information about the Series C network modules. Enter the following parameters:

```
myswitch::configuration module traffic c> show
 Module  Memory  Model    EPD  FIFOblock
 2A     128Kx48  2       6653  enabled
 2B     128Kx48  2       8036  enabled
 2C     128Kx48  2       8036  enabled
 2D     128Kx48  2       8036  enabled
```


The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Memory	The hardware configuration this shared memory model supports, in units of 48-bit words (x48).
Model	The shared memory model used for this network module. See **conf module traffic c models** for more information.
EPD	The threshold for AAL5 Early Packet Discard on this network module.
FIFOblock	Displays **enabled** if FIFO blocking is enabled on this network module. Otherwise, displays **normal**. The default is **normal**.

You can also display traffic model information about an individual Series C network module. Enter the following parameters:

```
myswitch::configuration module traffic c> show [<module>]
myswitch::configuration module traffic c> show 2C
 Module  Memory  Model    EPD  FIFOblock
 2C     128Kx48  2       8036  enabled
```

The fields in this display are defined in the same manner as those listed in the example above.

If no Series C network modules are installed, the following is displayed:

```
myswitch::configuration module traffic c> show
No Series-C traffic information is available
```

1.10.4.6 Configuring Traffic on a Series LC Network Module

These commands let you configure or display information about the traffic on Series LC network modules. To list the available subcommands, type **lc ?** at the **traffic** level.

```
myswitch::configuration module traffic> lc ?
  epd             efci            models          setmodel
  show
```

1.10.4.6.1 Setting EPD on a Series LC Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) on a Series LC network module. This is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 packets that arrive when the shared buffer is over this threshold are discarded in whole. Enter the following parameters:

```
myswitch::conf module traffic lc> epd <module> [UBR] <number of cells>
```

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured for Early Packet Discard.
UBR	If **UBR** is entered, the AAL5 packet drop threshold is used for AAL5 UBR connections only. If **UBR** is not entered, the AAL5 packet drop threshold is used for all other AAL5 connections.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. By default, this value is set to 90% of the shared buffer size.

1.10.4.6.2 Setting EFCI on a Series LC Network Module

This command lets you designate the cell buffer threshold over which Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set. When the EFCI code point is set, this signals congestion to downstream flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties below the `off` threshold. Enter the following parameters:

```
myswitch::conf module traffic lc> efci <module> (on | off) <number of cells>
```


These parameters are defined as follows:

Parameter	Description
module	The port on which the EFCI threshold will be set.
on | off[1]	**on** means the EFCI bit will be set when the threshold number is reached, signalling congestion. **off** means the EFCI bit will be cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the ABR[2] cells will have the EFCI bit set. The default for the **on** threshold is 64. The default for the **off** threshold is 1.

1. The value for the **off** threshold must always be less than the value for the **on** threshold.
2. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.10.4.6.3 Displaying Traffic Models for a Series LC Network Module

This command allows you to display the different types of traffic memory models on a Series LC network module. Enter the following parameters:

```
myswitch::configuration module traffic lc> models
          Cell   Table
 Model  Memory  Memory Ucasts Mcasts  Cells Counters  Name
 1     256Kx64  32Kx32   6144    512  32768        0  default
 2     256Kx64  32Kx32   6144    512  16384        1  one counter
 3     256Kx64  32Kx32   6144    512   8192        2  two counters
 4     256Kx64  64Kx32   6144    512  32768        2  default
 5     512Kx64  64Kx32   6144    512  65536        2  default
 6     256Kx64  32Kx32   4096   1024  24576        1  more mcast
 7     256Kx64  64Kx32   4096   1024  32768        2  more mcast
 8     512Kx64  64Kx32   4096   1024  65536        2  more mcast
```

The fields in this display are defined as follows:

Field	Description
Model[1]	The shared memory model for this configuration. This is the number to enter for the *<model>* parameter when using the **conf module traffic lc setmodel** command.
Cell Memory[2]	The hardware configuration this shared memory model supports, in units of 64-bit words (x64).
Table Memory	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Ucasts	The maximum number of unicast connections supported by this shared memory configuration.
Mcasts[3]	The number of input multicast connections supported from the switch fabric to the network module by this shared memory configuration.
Cells	The total amount of cell buffering that is supported by this shared memory configuration.
Counters	The number of per-connection counters that is supported by this shared memory configuration. `0` means there are no per-connection counters. `1` means there are per-connection counters for cells transmitted and for cells lost. `2` means there are per-connection counters for cells transmitted, for cells lost, for intentional cells lost, and for unintentional cells lost.
Name	The identifier for this shared memory model.

1. For proper operation, all Series LC network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LC modules in a switch should either use models 1-5 OR models 6-8.

   The following Series LC network modules can only use the following traffic memory models: OC-3 MM and UTP can only use models 1, 2, 3, and 6; OC-3 SM can only use models 4 and 7; and OC-12 MM and SM can only use models 5 and 8.

2. The `Cell Memory` and `Table Memory` sizes determine which memory models are appropriate for any given network module.

3. Only one multicast output is supported per port for each multicast connection.

1.10.4.6.4 Setting Traffic Models on a Series LC Network Module

This command lets you select one of the traffic memory models on a Series LC network module. Enter the following parameters:

```
myswitch::configuration module traffic lc> setmodel <module> <model>
```

These parameters are defined as follows:

Parameter	Description
module[1]	The network module to be configured.
model[2]	The predefined memory model to be used for this Series LC network module. The various models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections, and the number of per-connection counters. Enter the number found in the `Model` field of the **`conf module traffic lc models`** AMI command for the shared memory configuration that you want to use.

1. For proper operation, all Series LC network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LC modules in a switch should either use models 1-5 OR models 6-8.

   The following Series LC network modules can only use the following traffic memory models: OC-3 MM and UTP can only use models 1, 2, 3, and 6; OC-3 SM can only use models 4 and 7; and OC-12 MM and SM can only use models 5 and 8.

2. The switch software must be restarted for this command to take effect.

1.10.4.6.5 Displaying Traffic on a Series LC Network Module

This command lets you display traffic model information about all of the Series LC network modules in a switch fabric. Enter the following parameters:

```
myswitch::configuration module traffic lc> show
           Cell   Table                  UBR   EFCI   EFCI
 Module  Memory  Memory  Model    EPD    EPD     On    Off
 1A     256Kx64  32Kx32  3        256    256    256      1
 1B     256Kx64  32Kx32  3        256    256    256      1
 1D     512Kx64  64Kx32  7      58050  58050     64      1
```

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Cell Memory	The hardware configuration this memory model supports (x64).
Table Memory	The hardware configuration this memory model supports (x32).
Model	The shared memory model used for this network module. See **`conf module traffic lc models`** for more information.
EPD	The AAL5 packet drop threshold for CBR, VBR, and ABR traffic on this network module, in cells.
UBR EPD	The AAL5 packet drop threshold for UBR traffic on this network module, in cells.
EFCI On	The threshold value at which the EFCI will be set (turned on), signalling congestion, for ABR[1] traffic, in cells.
EFCI Off	The threshold value at which the EFCI will be cleared (turned off), indicating no congestion for ABR traffic, in cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

You can also display traffic model information about an individual Series LC network module. Enter the following parameters:

```
myswitch::configuration module traffic lc> show [<module>]
myswitch::configuration module traffic lc> show 1B
           Cell   Table                  UBR   EFCI   EFCI
 Module  Memory  Memory  Model    EPD    EPD     On    Off
 1B     256Kx64  32Kx32  3        256    256    256      1
```

The fields in this display are defined in the same manner as those listed in the example above.

If no Series LC network modules are installed, the following is displayed:

```
myswitch::configuration module traffic lc> show
No Series-LC traffic information is available
```

1.10.4.7 Configuring Traffic on a Series LE Network Module

These commands let you configure or display information about the traffic on Series LE network modules. To list the available subcommands, type **le ?** at the **traffic** level.

```
myswitch::configuration module traffic> le ?
  epd             efci            models          setmodel
  show
```

The **conf module traffic le** commands are only valid on an LE 155 switch.

1.10.4.7.1 Setting EPD on a Series LE Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) on a Series LE network module. This is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 packets that arrive when the shared buffer is over this threshold are discarded in whole. Enter the following parameters:

```
myswitch::conf module traffic le> epd <module> [UBR] <number of cells>
```

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured for Early Packet Discard.
UBR	If **UBR** is entered, the AAL5 packet drop threshold is used for AAL5 UBR connections only. If **UBR** is not entered, the AAL5 packet drop threshold is used for all other AAL5 connections.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. By default, this value is set to 90% of the shared buffer size.

1.10.4.7.2 Setting EFCI on a Series LE Network Module

This command lets you designate the cell buffer threshold over which Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set. When the EFCI code point is set, this signals congestion to downstream flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties below the `off` threshold. Enter the following parameters:

```
myswitch::conf module traffic le> efci <module> (on | off) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
module	The port on which the EFCI threshold will be set.
on | off[1]	**on** means the EFCI bit will be set when the threshold number is reached, signalling congestion. **off** means the EFCI bit will be cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the ABR[2] cells will have the EFCI bit set. The default for the **on** threshold is 64. The default for the **off** threshold is 1.

1. The value for the **off** threshold must always be less than the value for the **on** threshold.
2. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.10.4.7.3 Displaying Traffic Models for a Series LE Network Module

This command allows you to display the different types of traffic memory models on a Series LE network module. Enter the following parameters:

```
myswitch::configuration module traffic le> models
          Cell   Table
 Model  Memory  Memory Ucasts Mcasts  Cells Counters  Name
 1     256Kx64  32Kx32   6144    512  32768        0  default
 2     256Kx64  32Kx32   6144    512  16384        1  one counter
 3     256Kx64  32Kx32   6144    512   8192        2  two counters
 4     256Kx64  64Kx32   6144    512  32768        2  default
 5     512Kx64  64Kx32   6144    512  65536        2  default
 6     256Kx64  32Kx32   4096   1024  24576        1  more mcast
 7     256Kx64  64Kx32   4096   1024  32768        2  more mcast
 8     512Kx64  64Kx32   4096   1024  65536        2  more mcast
```


The fields in this display are defined as follows:

Field	Description
Model[1]	The shared memory model for this configuration. This is the number to enter for the *<model>* parameter when using the **conf module traffic le setmodel** command.
Cell Memory[2]	The hardware configuration this shared memory model supports, in units of 64-bit words (x64).
Table Memory	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Ucasts	The maximum number of unicast connections supported by this shared memory configuration.
Mcasts[3]	The number of input multicast connections supported from the switch fabric to the network module by this shared memory configuration.
Cells	The total amount of cell buffering that is supported by this shared memory configuration.
Counters	The number of per-connection counters that is supported by this shared memory configuration. `0` means there are no per-connection counters. `1` means there are per-connection counters for cells transmitted and for cells lost. `2` means there are per-connection counters for cells transmitted, for cells lost, for intentional cells lost, and for unintentional cells lost.
Name	The identifier for this shared memory model.

1. For proper operation, all Series LE network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LE modules in a switch should either use models 1-3 OR model 6.

   The Series LE network modules can only use the following traffic memory models: 1, 2, 3, and 6.

2. The `Cell` and `Table Memory` sizes determine which memory models are appropriate for a given network module.

3. Only one multicast output is supported per port for each multicast connection.

1.10.4.7.4 Setting Traffic Models on a Series LE Network Module

This command lets you select one of the traffic memory models on a Series LE network module. Enter the following parameters:

```
myswitch::configuration module traffic le> setmodel <module> <model>
```

These parameters are defined as follows:

Parameter	Description
module[1]	The network module to be configured.
model[2]	The predefined memory model to be used for this Series LE network module. The various models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections, and the number of per-connection counters. Enter the number found in the `Model` field of the **`conf module traffic le models`** AMI command for the shared memory configuration that you want to use.

1. For proper operation, all Series LE network modules in a switch must use memory models that support the same number of unicast connections. Therefore, all Series LE modules in a switch should either use models 1-3 OR model 6.

   The Series LE network modules can only use the following traffic memory models: 1, 2, 3, and 6.

2. The switch software must be restarted for this command to take effect.

1.10.4.7.5 Displaying Traffic on a Series LE Network Module

This command lets you display traffic model information on the Series LE network modules. Enter the following parameters:

```
myswitch::configuration module traffic le> show
           Cell   Table                   UBR   EFCI   EFCI
 Module  Memory  Memory  Model    EPD    EPD     On    Off
 1B     256Kx64  32Kx32  2      16499  16499     64      1
 1C     256Kx64  32Kx32  2      16499  16499     64      1
```

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Cell Memory	The size of this shared memory cell RAM configuration (x64).
Table Memory	The size of this shared memory table RAM configuration (x32).
Model	The shared memory model used for this network module. See **conf module traffic le models** for more information.
EPD	The AAL5 packet drop threshold for CBR, VBR, and ABR traffic on this network module, in cells.
UBR EPD	The AAL5 packet drop threshold for UBR traffic on this network module, in cells.
EFCI On	The threshold value at which the EFCI will be set (turned on), signalling congestion, for ABR[1] traffic, in cells.
EFCI Off	The threshold value at which the EFCI will be cleared (turned off), indicating no congestion for ABR traffic, in cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

You can also display traffic model information about an individual Series LE network module. Enter the following parameters:

```
myswitch::configuration module traffic le> show [<module>]
myswitch::configuration module traffic le> show 1B
           Cell   Table                   UBR   EFCI   EFCI
 Module  Memory  Memory  Model    EPD    EPD     On    Off
 1B     256Kx64  32Kx32  2      16499  16499     64      1
```

The fields in this display are defined in the same manner as those listed in the example above.

If no Series LE network modules are installed (this is not an LE 155 switch), then the following is displayed:

```
myswitch::configuration module traffic le> show
No Series-LE traffic information is available
```

1.10.4.8 Configuring Traffic on a Series D Network Module

These commands let you configure or display information about the traffic on on Series D network modules. To list the available subcommands, type **?** at the **d** level.

```
myswitch::configuration module traffic d> ?
  aal5pktcount     altclpthresh     epd              efci
  models           setmodel         show             vcclpthresh
```

1.10.4.8.1 Enabling/Disabling the AAL5 Transmitted PDU Counter

This command lets you enable or disable the per-connection AAL5 transmitted Protocol Data Unit (PDU) counter on a per network module basis on a Series D network module. Enter the following parameters:

```
myswitch::configuration module traffic d> aal5pktcount <module> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
module[1]	The network module to be configured for counting AAL5 packets.
enable | disable	**enable** means the network module will count the number of transmitted AAL5 PDUs. **disable** means the network module will not count the number of transmitted AAL5 PDUs. The default is **disable**.

1. You must reset the network module once you have entered this command.

1.10.4.8.2 Configuring Alternate CLP Thresholds

This command allows you to set the per-connection alternate CLP thresholds on a per network module basis. Enter the following:

```
myswitch::configurat module traffic d> altclpthresh <module> (clp1 | clp01) <threshold>
```

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured with a new CLP threshold.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for a connection is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the CLP=0+1 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for a connection is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the CLP=1 threshold.
threshold	The number of cells in the per-connection buffer at which the connection drops CLP=1 or CLP=0+1 cells. These thresholds can only be adjusted in increments of multiples of 16 cells (e.g., 16, 32, 48). For CLP=1, the minimum value is 0, the maximum is the CLP=0+1 threshold - 16 cells, and the default is 256 cells. For CLP=0+1, the minimum value is the CLP=1 threshold + 16 cells, the maximum is 4,080 cells, and the default is 4,080 cells.

1.10.4.8.3 Setting EPD on a Series D Network Module

This command lets you set a threshold value for AAL5 Early Packet Discard (EPD) for UBR traffic and a different threshold value for AAL5 EPD for CBR, VBR, and ABR traffic on a Series D network module. This works differently than it does for other network modules. On a Series D network module, this is the static threshold (in terms of a specified number of cells) at which EPD is activated. AAL5 packets are discarded in whole if they arrive when the total cell buffering is over this threshold and when the corresponding dedicated queue is full. Enter the following:

```
myswitch::configuration module traffic d> epd <module> [ubr] <number of cells>
```

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured for Early Packet Discard.
ubr	If **ubr** is entered, the AAL5 packet drop threshold is used for AAL5 UBR connections only. If **ubr** is not entered, the AAL5 packet drop threshold is used for CBR, VBR, and ABR[1] AAL5 connections.
number of cells	The AAL5 packet drop threshold to be set, in number of cells. The default value is set to 90% of the total cell buffer size for both the UBR and non-UBR thresholds.

1. The Series D network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.10.4.8.4 Setting EFCI on a Series D Network Module

This command lets you designate the cell buffer threshold over which all cells have their explicit forward congestion indicator (EFCI) code point set. When the EFCI code point is set, this signals congestion to downstream flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties below the `off` threshold. Enter the following parameters:

```
myswitch::configuration module traffic d> efci <module> (on | off) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
module	The network module on which the EFCI threshold will be set.
on | off[1]	**on** means the EFCI bit will be set when the threshold number is reached, signalling congestion. **off** means the EFCI bit will be cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the cells will have the EFCI bit set. This number must be entered in increments of 32. The default for the **on** threshold is 256. The default for the **off** threshold is 192.

1. The value for the **off** threshold must always be less than or equal to the value for the **on** threshold.

1.10.4.8.5 Displaying Traffic Models for a Series D Network Module

This command allows you to display the different types of traffic memory models on a Series D network module. Enter the following parameters:

```
myswitch::configuration module traffic d> models
          Cell   Table
 Model  Memory  Memory Ucasts Mcasts  MOuts  Cells Counters  Name
 1     256Kx32 256Kx32  12288   1024   4096  16352        8  16K cells OC-12
 2     256Kx32 256Kx32  12288   1024   4096  16352        8  16K cells OC-3
 3     256Kx32 256Kx32  10240    512   4096  16352        8  16K cells DSn/En
 4     512Kx32 256Kx32  12288   1024   4096  32736        8  32K cells OC-12
 5     512Kx32 256Kx32  12288   1024   4096  32736        8  32K cells OC-3
 6     512Kx32 256Kx32  10240    512   4096  32736        8  32K cells DSn/En
```

The fields in this display are defined as follows:

Field	Description
Model[1]	The shared memory model for this configuration. This is the number to enter for the *<model>* parameter when using the **conf module traffic d setmodel** command.
Cell Memory[2]	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Table Memory	The hardware configuration this shared memory model supports, in units of 32-bit words (x32).
Ucasts	The maximum number of unicast connections supported by this shared memory configuration.
Mcasts	The number of input multicast connections supported from the switch fabric to the network module by this shared memory configuration.
MOuts	The number of output multicast connections supported from the network module to the link for this shared memory model. Any multicast connection can have multiple outputs on the same network module or the same port. If one multicast connection has four outputs, it requires 1 mcast and 4 mouts.
Cells	The total amount of cell buffering that is supported by this shared memory configuration.
Counters[3]	The number of per-connection counters that is supported by this shared memory configuration. The counters are: 1 - Transmit (CLP=0) counter, 2 - Transmit (CLP=1) counter, 3 - EPD counter, 4 - Unintentional cell loss counter, 5 - CLP=1 threshold counter, 6 - CLP=0+1 threshold counter, 7 - Intentional PPD counter, and 8 - Transmit packet counter.
Name	The identifier for this shared memory model.

1. The following Series D network modules can only use the following traffic memory models: OC-12 network modules can only use model 4; OC-3 network modules can only use model 5; and DS3, E3, DS1, and E1 network modules can only use model 6. Models 1, 2, and 3 are not used.
2. The `Cell` and `Table Memory` sizes determine which memory models are appropriate for a given network module.
3. If the module packet counter is enabled under **conf module traffic d aal5pktcount**, the Transmit CLP=0 and CLP=1 counters are combined into a single Transmit CLP0+1 count.

1.10.4.8.6 Setting Traffic Models on a Series D Network Module

This command lets you select one of the traffic memory models on a Series D network module. Enter the following parameters:

```
myswitch::configuration module traffic d> setmodel <module> <model>
```

These parameters are defined as follows:

Parameter	Description
module[1]	The network module to be configured.
model[2]	The predefined memory model to be used for this Series D network module. The various models make different trade-offs between the number of cell buffers, and the number of unicast and multicast connections, and the number of per-connection counters. Enter the number found in the `Model` field of the **`conf module traffic d models`** AMI command for the shared memory configuration that you want to use.

1. The following Series D network modules can only use the following traffic memory models: OC-12 network modules can only use model 4; OC-3 network modules can only use model 5; and DS3, E3, DS1, and E1 network modules can only use model 6. Models 1, 2, and 3 are not used.
2. The network module must be reset for this command to take effect.

Since there is currently only one valid model for each type of network module, the software will not allow you to change the memory model for a Series D network module.

1.10.4.8.7 Displaying Traffic on a Series D Network Module

This command lets you display traffic information about the Series D network modules. Enter the following parameters:

```
myswitch::configuration module traffic d> show
           Cell                  UBR   EFCI   EFCI    AAL5   AltVC Thresholds
 Module  Memory Model    EPD     EPD     On     Off  PktCnt   CLP0+1      CLP1
 1A     256Kx32     2  14717   14717    256    192 disable     4080       256
 1B     256Kx32     1  14717   14717    256    192 disable     4080       256
 1C     256Kx32     3  14717   14717    256    192 disable     4080       256
 1D     256Kx32     3  14717   14717    256    192 disable     4080       256
```

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Cell Memory	The size of this shared memory cell RAM configuration (x32).
Model	The shared memory model used for this network module. See **conf module traffic d models** for more information.
EPD	The AAL5 packet drop threshold for CBR, VBR, and ABR traffic on this network module, in cells.
UBR EPD	The AAL5 packet drop threshold for UBR traffic on this network module, in cells.
EFCI On	The threshold value at which the EFCI bit will be set (turned on), signalling congestion, for all traffic, in cells.
EFCI Off	The threshold value at which the EFCI bit will be cleared (turned off), indicating no congestion for all traffic, in cells.
AAL5 PktCnt	**enable** means the network module counts the number of transmitted AAL5 PDUs. **disable** means the network module does not count the number of transmitted AAL5 PDUs. The default is **disable**.
AltVC Threshold CLP0+1	The alternate threshold at which cells are dropped, regardless of their CLP bit, when the current cell count for a connection is greater than this threshold. This threshold is used instead of the VC CLP0+1 threshold if the **conf port traffic d altclpconfig** command is applied or if it is enabled using the **-AltCLP** option under **conf upc new**.
AltVC Threshold CLP1	The alternate threshold at which cells that are CLP=1 are dropped when the current cell count for a connection is greater than this threshold. This threshold is used instead of the VC CLP1 threshold if the **conf port traffic d altclpconfig** command is applied or if it is enabled using the **-AltCLP** option under **conf upc new**.

You can also display traffic model information about an individual Series D network module. Enter the following parameters:

```
myswitch::configuration module traffic d> show [<module>]
myswitch::configuration module traffic d> show 1A
           Cell                 UBR   EFCI   EFCI    AAL5   AltVC Thresholds
 Module  Memory Model    EPD    EPD     On    Off  PktCnt   CLP0+1     CLP1
 1A     256Kx32     2  14717  14717    256    192 disable     4080      256
```

The fields in this display are defined in the same manner as those listed previously.

You can also display traffic information about the Series D network modules on a per class basis. Enter the following parameters:

```
myswitch::configuration module traffic d> show [<module>] [perclass]
myswitch::configuration module traffic d> show perclass
                   VC Thresholds
 Module  Priority  CLP0+1     CLP1
 1A           CBR    3072     2048
 1A           VBR    3072     2048
 1A           UBR    3072     2048
 1A           ABR    3072     2048
 1B           CBR    3072     2048
 1B           VBR    3072     2048
 1B           UBR    3072     2048
 1B           ABR    3072     2048
 1C           CBR    3072     2048
 1C           VBR    3072     2048
 1C           UBR    3072     2048
 1C           ABR    3072     2048
 1D           CBR    3072     2048
 1D           VBR    3072     2048
 1D           UBR    3072     2048
 1D           ABR    3072     2048
```

The fields in this display are defined as follows:

Field	Description
Module	The network module that has been configured.
Priority[1]	The class of service to which these thresholds apply.
VC Thresholds CLP0+1	The threshold at which cells are dropped, regardless of their CLP bit, when the current cell count for a connection is greater than this threshold for this traffic type.
VC Thresholds CLP1	The threshold at which cells that are CLP=1 are dropped when the current cell count for a connection is greater than this threshold for this traffic type.

1. The Series D network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

If no Series D network modules are installed, then the following is displayed:

```
myswitch::configuration module traffic d> show
No Series-D traffic information is available
```

1.10.4.8.8 Configuring the VC CLP Threshold on a Series D Network Module

This command lets you configure the per-connection CLP threshold for all VCs on a per-class basis. Enter the following parameters:

`myswitch::configuration module traffic d>` **`vcclpthresh`** *<module>* (**`cbr`** | **`vbr`** | **`abr`** | **`ubr`**) (**`clp1`** | **`clp01`**) *<threshold>*

These parameters are defined as follows:

Parameter	Description
module	The network module to be configured.
cbr | vbr | abr[1] | ubr	The class of service for which this threshold applies.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for a connection is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the CLP=0+1 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for a connection is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the CLP=1 threshold.
threshold	The number of cells in the buffer at which the specified traffic type drops CLP=1 or CLP=0+1 cells. This threshold can only be adjusted in increments of multiples of 16 cells (e.g., 16, 32, 48). For CLP=1, the minimum value is 0, the maximum is the CLP=0+1 threshold - 16 cells, and the default is 256 cells. For CLP=0+1, the minimum value is the CLP=1 threshold + 16 cells, the maximum is 4,080 cells, and the default is 4,080 cells.

1. The Series D network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.11 NSAP Configuration Commands

These commands allow you to configure NSAP prefixes; to display ILMI registered NSAP addresses; to configure NSAP-to-E.164 address mappings; and to configure a table of LECS addresses that switches can query when attached LECs ask for the registered LECS address. To list the available commands, type **?** at the **nsap** level.

```
myswitch::configuration nsap> ?
  prefix>            ilmi>              e164>              registry>
```


1.11.1 NSAP Prefix Configuration Commands

These commands enable you to delete an NSAP prefix, create an NSAP prefix, and display NSAP prefix information. You can display the list of available subcommands by typing **?** at the **prefix** level.

```
myswitch::configuration nsap prefix> ?
  delete           new              show
```

1.11.1.1 Deleting an NSAP Prefix

This command lets you remove an existing NSAP prefix. Enter the following parameters:

```
myswitch::configuration nsap prefix> delete <port> <vpi> <prefix>
```

1.11.1.2 Creating an NSAP Prefix

This command lets you create an NSAP prefix. Enter the following parameters:

```
myswitch::configuration nsap prefix> new <port> <vpi> <prefix>
```

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number for this NSAP prefix.
vpi	The virtual path number for this NSAP prefix.
prefix[1]	The NSAP prefix for this entry.

1. Because multiple prefixes are not supported on the same port, delete the old prefix before creating a new one.

1.11.1.3 Displaying NSAP Prefixes

This command enables you to display the current list of NSAP prefixes. Enter the following parameters:

```
myswitch::configuration nsap prefix> show
Port      VPI NSAP-Prefix
1A1         0 0x47.0005.80.ffe100.0000.f124.00de
1A2         0 0x47.0005.80.ffe100.0000.f124.00de
1A3         0 0x47.0005.80.ffe100.0000.f124.00de
1A4         0 0x47.0005.80.ffe100.0000.f124.00de
1B1         0 0x47.0005.80.ffe100.0000.f124.00de
1B2         0 0x47.0005.80.ffe100.0000.f124.00de
1CTL        0 0x47.0005.80.ffe100.0000.f124.00de
```

The fields in this display are defined as follows:

Field	Description
Port	The port number for this NSAP prefix.
VPI	The virtual path number on which this NSAP prefix exists.
NSAP-Prefix	The NSAP prefix for this entry.

If you have not configured any NSAP prefixes, then the following message is displayed:

```
myswitch::configuration nsap prefix> show
No user configured NSAP prefix information is available
```

1.11.2 NSAP ILMI Configuration Command

This command lets you display the NSAP addresses of all of the ports on a switch fabric that have been registered via ILMI. ILMI address registration occurs between the switch and host. The switch sends the host its 13-byte NSAP prefix. If the host accepts the prefix, the host builds its own NSAP address by appending its 7-byte host specific part. The host returns the complete 20-byte NSAP address to the switch. If the switch accepts it, the switch enters that information into its topology tables and all connections destined for that NSAP address are routed to that host. These registration messages are sent over the reserved channel VPI 0, VCI 16. You can display the available subcommand by typing **`ilmi ?`** at the **`nsap`** level.

```
myswitch::configuration nsap> ilmi ?
  show
```


1.11.2.1 Displaying NSAP Addresses Registered through ILMI

This command lets you display the NSAP addresses of all of the ports on a switch fabric that have been registered via ILMI. Enter the following parameters:

```
myswitch::configuration nsap ilmi> show
Port  NsapAddress
1D1   47000580ffe1000000f215116f00204810308600
```

The fields in this display are defined as follows:

Field	Description
Port	The port number for which an NSAP address has been registered via ILMI.
NSAPAddress	The NSAP address that has been registered through ILMI for this port.

To display the NSAP addresses that have been registered via ILMI for a specific port, enter the following parameters:

```
myswitch::configuration nsap ilmi> show [<port>]
myswitch::configuration nsap ilmi> show 1B1
Port  NsapAddress
1B1   47000580ffe1000000f215116f00204810046400
```

If no addresses have been registered via ILMI, the following is displayed:

```
No NSAP address information is available
```

1.11.3 NSAP-to-E.164 Configuration Commands

These commands let you display NSAP-to-E.164 address mapping information, create an NSAP-to-E.164 address mapping, and delete an NSAP-to-E.164 address mapping. You can display the list of available subcommands by typing **e164 ?** at the **nsap** level.

```
myswitch::configuration nsap> e164 ?
  show              new               delete
```

1.11.3.1 Displaying NSAP-to-E.164 Address Mapping Information

This command enables you to display the current NSAP-to-E.164 address mapping information. Enter the following parameters:

```
myswitch::configuration nsap e164> show
 Port VPI NSAP-Address                                Mask Native-E164Address
 3B2  0   47000580ffe1000000f21a00d00020481a00d000 152  4126352756
```

The fields in this display are defined as follows:

Field	Description
Port	The port number on which the NSAP-to-E.164 address mapping exists
VPI	The virtual path number on which the NSAP-to-E.164 address mapping is to be created.
NSAP-Address	The NSAP address for this mapping.
Mask	The number of leading significant bits for this NSAP address.
Native-E164Address	The E.164 address, which can be up to 15 ASCII digits (0-9) long.

If no NSAP-to-E.164 mapping information has been configured, you receive the following message:

```
myswitch::configuration nsap> e164 show
No NSAP <-> E.164 Mapping information is available.
```

1.11.3.2 Adding an NSAP-to-E.164 Address Mapping

This command lets you map an NSAP address to an E.164 address format. Enter the following parameters:

```
myswitch::configuration nsap e164> new <port> <vpi> <NSAP> <mask> <E.164>
```

The following is an example of how to add an NSAP-to-E.164 mapping to the mapping table:

```
myswitch::configuration nsap e164> new 3b2 0
0x47.0005.80.ffe100.0000.f21a.00d0.0020481a00d0.0b 152 4126352756
```


1.11.3.3 Deleting an NSAP-to-E.164 Address Mapping

This command lets you remove an existing NSAP-to-E.164 address mapping. Enter the following parameters:

```
myswitch::configuration nsap e164> delete <port> <vpi> <NSAP> <mask>
```

The following is an example of how to delete an NSAP-to-E.164 mapping from the mapping table:

```
myswitch::configuration nsap e164> del 3B2 0 47000580ffe1000000f21a00d00020481a00d000
152
```

The parameters for new and delete are defined as follows:

Parameter	Description
port	The port number for this NSAP-to-E.164 address mapping.
vpi	The virtual path number for this NSAP-to-E.164 address mapping.
NSAP	The NSAP address for this entry.
mask	The number of leading significant bits for this NSAP address.
E.164	The E.164 address, which can be up to 15 ASCII characters long.

1.11.4 ILMI LECS Address Registry Commands

These commands let you configure a table of LECS addresses per port. The LAN Emulation Client (LEC) on the user side of the ATM UNI port uses ILMI to query the attached switch for the registered LECS address. You can display the list of available subcommands by typing **?** at the **registry** level.

```
myswitch::configuration nsap registry> ?
  show              delete            new
```

1.11.4.1 Displaying the ILMI LECS Address Registry

This command lets you display the contents of the ILMI LECS address registry. Enter the following parameters:

```
myswitch::configuration nsap registry> show
Port Type Instance Nsap-Address
1A1  LECS    1     0x47.0005.80.ffe100.0000.f21a.23c0.0020481a23c0.55
1A1  LECS    2     0x47.0005.80.ffe100.0000.f21a.00d0.0020481b7821.00
1A1  LECS    1     0x47.0005.80.ffe100.0000.f21a.116f.002048103086.02
```

The fields in this display are defined as follows:

Field	Description
Port	The port number for the interface. An * to the left of the port number means that entry is still being created and is not active yet.
Type	This is a read-only field that indicates the type of service that is available at the given NSAP address.
Instance	A user-configurable index number that distinguishes between addresses when multiple LECS addresses are assigned to the same port.
Nsap-Address	The LECS address assigned to this port.

If no entries have been configured in the registry, then the following is displayed:

```
myswitch::configuration nsap registry> show
No information is available
```

1.11.4.2 Deleting an ILMI LECS Address Registry Entry

This command lets you delete an entry or multiple entries from the ILMI LECS address registry. Enter the following parameters:

```
myswitch::configuration nsap registry> delete lecs <port> <instance>
```

For example, you can delete a specific instance on a specific port as follows:

```
myswitch::configuration nsap registry> delete lecs 1A2 2
```

This example only deletes instance number 2 from port 1A2.

You can also delete a specific instance on the control port (CTL) as follows:

```
myswitch::configuration nsap registry> new lecs 1CTL 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example only delete instance number 1 from port 1CTL. (On an ASX-1000 or a TNX-1100, you need to specify the board number; e.g., 2CTL.)

You can also use an asterisk (*) as a wildcard character to delete all registered addresses on a switch fabric that have the same instance number as follows:

```
myswitch::configuration nsap registry> delete lecs * 2
Are you sure you want to delete *ALL* LECS entries with 2 as the instance [n]? y
```

If you type **n** or press **<ENTER>**, the command is aborted. If you type **y**, all registered addresses on that switch fabric with the instance number 2 are deleted.

Additionally, you can use an asterisk (*) as a wildcard character to delete registered addresses from all ports on a specific network module. The wildcard character does not apply to the CTL port. Enter the * in the network module portion of the port number as follows:

```
myswitch::configuration nsap registry> delete lecs C* 1
```

This example deletes all registered addresses on all ports on network module C with instance number 1.

1.11.4.3 Adding an ILMI LECS Address Registry Entry

This command lets you add an entry or multiple entries to the ILMI LECS address registry. A maximum of 4 entries may be configured on each port. Enter the following parameters:

```
myswitch::configuration nsap registry> new lecs <port> <instance> <nsap-address>
```

If the switch port you specify is already configured with an ATM address with the same instance that you specify, the command fails.

For example, you can create a specific instance on a specific port as follows:

```
myswitch::configuration nsap registry> new lecs 1A1 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example only creates instance number 1 on port 1A1.

You can also create a specific instance on the control port (CTL) as follows:

```
myswitch::configuration nsap registry> new lecs 1CTL 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example only creates instance number 1 on port 1CTL. (On an ASX-1000 or a TNX-1100, you need to specify the board number; e.g., 2CTL.)

You can also use an asterisk (*) as a wildcard character for the port number to register the same LECS address on all existing ports on a switch fabric as follows:

```
myswitch::configuration nsap registry> new lecs * 1
47000580ffe1000000f21a00d00020481a00d00b
```

This example creates instance number 1 with the specified address on all existing ports in switch fabric 1.

Additionally, you can use an asterisk (*) as a wildcard character to register the same LECS address on all ports on a specific network module. The wildcard character does not apply to the CTL port. Enter the * in the network module portion of the port number as follows:

```
myswitch::configuration nsap registry> new lecs B* 1
47000580ffe1000000f21a00d00020481b78210a
```

This example registers the specified address as instance 1 on all ports on network module B.

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number for this ILMI LECS address registry entry.
instance	A user-configurable index number that distinguishes between the LECS addresses when multiple LECS addresses are assigned to the same port. This number can be from 1 to 4.
nsap-address	The NSAP address of the LECS for this entry.

1.12 Port Configuration Commands

These commands let you manage the configuration of the various ports. Type **port ?** at the **configuration** level to display the available subcommands.

```
myswitch::configuration> port ?
  aal5packetdiscard  admin              aisrdi             cac
  cdvt               cesds1>            cese1>             delay
  ds1>               ds3>               e1>                e3>
  gcrapolicing       j2>                led>               policing
  pppolicing         show               sonet>             taxi>
  tp25>              traffic>           ubrtagging         vbrbuffob
  vbrob
```

1.12.1 AAL5 Packet Discard Command

This command lets you configure EPD / PPD on a per-port / per-class basis for all CBR, VBR, and / or UBR SVCs and / or PVCs. Enter the following parameters:

Even though packet discard is disabled on a certain port, class, or connection, partial packet policing may still occur on that same port, class, or connection. This is because partial packet policing occurs on the input side of the switch and partial packet discard occurs on the output side of the switch in the network module queues.

```
myswitch::configuration port> aal5packetdiscard <port> (cbr | vbr | ubr)(allOn | allOff
| svcOn | svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which packet discard is being configured.
cbr | vbr | ubr	The class of service for which you are configuring packet discard.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service leaving on this port are subjected to packet discard.
allOff	**allOff** means no (SVCs and PVCs) connections of the specified class of service leaving on this port are subjected to packet discard.
svcOn	**svcOn** means all SVCs of the specified class of service leaving on this port are subjected to packet discard. PVCs are subjected to packet discard based on their UPC contract. This is the default.
svcOff	**svcOff** means no SVCs of the specified class of service leaving on this port are subjected to packet discard. PVCs are subjected to packet discard based on their UPC contract.

For example, to enable packet discard on all CBR SVCs and PVCs on port 2B4, enter the following parameters:

```
myswitch::configuration port> aal5packetdiscard 2b4 cbr allOn
```

1.12.2 Configuring the State of a Port

This command allows you to change the state of a port to be up (on-line) or down (off-line). When a port is down, all signalling and communication is disabled. This command is useful for taking a port out of service temporarily to perform diagnostics. Enter the following parameters:

```
myswitch::configuration port> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The particular port to be managed.
up | down	**up** brings the designated port on-line. **down** takes the designated port off-line.

1.12.3 AISRDI Port Configuration Commands

When a physical layer fault (loss of carrier, loss of frame, etc.) is detected on a port that has AIS/RDI (Alarm Indication Signal)/(Remote Defect Indication) enabled, OAM cells are generated for all through paths, originating paths, PVCs, and PNNI SPVCs that originate on that port. If a virtual path AIS condition is indicated (by receipt of F4 AIS cells on a terminating path), OAM cells are generated for only that path and for channels (PVCs and PNNI SPVCs) that originate on that path. SVCs and SPANS SPVCs do not generate AIS cells. RDI cells are generated upstream from a terminating path whenever an OAM condition exists on the receiving side of that port. An AIS is sent in the downstream direction (away from the failure). Receiving an AIS cell indicates that a physical layer failure condition is present upstream from the receiver. An RDI cell is sent toward the failure when a physical fault or AIS condition is detected on the virtual path and channel. Receiving an RDI cell means that a fault exists in the transit pathway of the virtual connection described by the RDI cell. This command lets you enable or disable ATM layer AIS/RDI OAM cell generation on a specific port. Enter the following:

Currently, AIS/RDI OAM cell generation is supported only for point-to-point connections.

```
myswitch::configuration port> aisrdi <port> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable | disable	**enable** means OAM cells are generated when AISs and RDIs are detected. **disable** means AISs and RDIs are ignored when they are detected. No OAM cells are generated.

If OAM cell generation is enabled on any ports using this command, that condition may be overridden using **conf board oam disable**. In that case, the port level settings are still retained, but OAM cell generation ceases on all ports on the board. When **conf board oam enable** is entered, all ports on the board use their last port level settings again, so OAM cell generation starts again only on the ports on which it was last enabled.

1.12.4 CAC Port Configuration Command

By disabling Connection Admission Control (CAC) on a particular port, you allow connections to be set up without restrictions on the available bandwidth. However, note that if CAC is disabled on a given port, care must be taken. The switch may not be able to guarantee the bandwidth that has been allocated on the port. To configure CAC on a particular port, enter the following parameters:

```
myswitch::configuration port> cac <port> (enable | disable)
```


These parameters are defined as follows:

Parameter	Description
port	The port number on which CAC is to be configured.
enable | disable	`enable` means CAC is active on this port. `disable` means CAC is not active on this port. The default is `enable`.

If you change the CAC state on a port, you will be asked to reset the network module. For example:

```
myswitch::configuration port> cac 1a3 disable

Changing the CAC state on a port must be followed by a
reset of the network module for the new CAC setting to
become effective.

Note that changing the CAC state from disabled to enabled
may result in the loss of previously provisioned connections.

Change the CAC state [n]? y

Reset the network module [n]? y
Network module 1A reset
```

The CAC state is always enabled on the control port (CTL), and is always disabled on CEM network modules and on the backplane module (E) on an ASX-1000 and a TNX-1100.

1.12.5 CDVT Port Configuration Command

This command lets you modify the input Cell Delay Variation Tolerance (CDVT) on a per-port basis. Enter the following parameters:

```
myswitch::configuration port> cdvt <port> <us>
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the CDVT is to be changed.
us	The new value for the CDVT setting, in microseconds.

1.12.6 DS1 CES Port Configuration Commands

These commands allow you to configure the ports on a DS1 CES network module. The following **cesds1** commands are valid only when a DS1 CES network module is installed in the switch fabric. You can display the list of subcommands by typing **cesds1 ?** at the **port** level.

```
myswitch::configuration port> cesds1 ?
  admin            framing          length           linestatus
  loopback         mode             show
```

These commands are not available locally on an ASX-200WG nor on an LE 155.

1.12.6.1 Enabling/Disabling CES on a Port

This command lets you enable or disable CES on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which CES is to be enabled or disabled.
up | down	Indicates whether CES is to be enabled or disabled on the selected port. **up** means that CES will be enabled. **down** means that CES will be disabled.

1.12.6.2 Configuring DS1 CES Port Framing

This command lets you change the framing mode on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> framing <port> (ESF|SF)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port for which the framing mode is being set.
ESF | SF	The type of framing for this port. **ESF** indicates that ESF (Extended Super Frame) framing will be used. **SF** indicates that SF (Super Frame) framing will be used.

1.12.6.3 Configuring DS1 CES Port Line Length

This command lets you change the line length of a DS1 CES port to correspond to the physical cable attached to that port. This lets the DS1 CES port anticipate the strength of the received signal on the cable. Enter the following:

```
myswitch::conf port cesds1> length <port> (<130 | 130-260 | 260-390 | >390)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port for which the framing mode is being set.
<130	The physical cable is shorter than 130 feet long
130 - 260	The physical cable is from 130 to 260 feet long.
260 - 390	The physical cable is from 260 to 390 feet long.
>390	The physical cable is greater than 390 feet long.

1.12.6.4 Displaying DS1 CES Port Line Status

This command lets you display the current line status of each DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> linestatus
           Rx  Tx  Rx  Tx
Port Alarm LOF LOF AIS AIS LOF LOS Loopback
2A1  no    no  no  no  no  no  yes off
2A2  no    no  no  no  no  no  yes off
2A3  no    no  no  no  no  no  yes off
2A4  no    no  no  no  no  no  yes off
2A5  no    no  no  no  no  no  yes off
2A6  no    no  no  no  no  no  yes off
```

The fields in this display are defined as follows:

Field	Description
Port	The DS1 CES port number.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the receiving port is experiencing a Loss of Frame (LOF).
Tx LOF	Indicates whether or not the transmit port is experiencing a Loss of Frame (LOF).
Rx AIS	Indicates whether or not the receiving port is experiencing an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the transmit port is experiencing an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the DS1 CES connection is experiencing a Loss of Frame (LOF).
LOS	Indicates whether or not the DS1 CES connection is experiencing a Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.

1.12.6.5 Configuring DS1 CES Port Loopback

This command lets you designate the type of loopback on a DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> loopback <port> (line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which the loopback mode is to be changed.
line	**line** loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Cells that are switched to this port are not sent over the line.
none	**none** designates that no loopback will take place. This is the default setting.

1.12.6.6 Configuring the DS1 CES Port Line Coding

The mode command lets you configure the line coding for a particular DS1 CES port. Enter the following:

```
myswitch::configuration port cesds1> mode <port> (B8ZS|AMI)
```

These parameters are defined as follows:

Parameter	Description
port	The DS1 CES port on which the line coding is to be changed.
B8ZS | AMI	The type of coding to be used. **B8ZS** means that Binary 8-Zero Substitution will be used. **AMI** means that Alternate Mark Inversion will be used (see the *Glossary*).

1.12.6.7 Displaying the DS1 CES Port Configuration

This command lets you display the current configuration of each DS1 CES port. Enter the following parameters:

```
myswitch::configuration port cesds1> show
Port      Framing Carrier Line Loopback Port     Line    Line
          Mode    State   Code State    Timing   Length  Status
2A1  down ESF     no      B8ZS none     internal <130    64
2A2  down ESF     no      B8ZS none     internal <130    64
2A3  down ESF     no      B8ZS none     internal <130    64
2A4  down ESF     no      B8ZS none     internal <130    64
2A5  down ESF     no      B8ZS none     internal <130    64
2A6  down ESF     no      B8ZS none     internal <130    64
```

The fields in this display are defined as follows:

Field	Description
Port	The DS1 CES port number and the state of the port (**up** or **down**).
Framing Mode	The type of framing used on the line.
Carrier State[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Line Code	The type of line coding used on the port.
Loopback State	The loopback mode on the port.
Port Timing	The source of the timing on this port. The values are one of: <BNP> indicating the board / network module / port from which the timing is being extracted, srts indicating that srts is being used on this port, **fabric** *<X>* where *X* is 1, 2, 3, or 4 indicating that timing is being sourced from another switch fabric (only applicable to an ASX-1000 or TNX-1100), **network** indicating that the clock is being derived from the line itself, or **crystal** indicating that the crystal on the network module itself is being used.
Line Length	The length of the physical cable attached to this port.
Line Status	The line status of the DS1 CES port.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

1.12.7 CESE1 Port Configuration Commands

These commands let you modify various aspects of the configuration of the ports on a E1 CES network module. The following **cese1** commands are available only when a E1 CES network module is installed in the switch fabric. To list the available subcommands, type **cese1 ?** at the **port** level.

```
myswitch::configuration port> cese1 ?
  admin              crc4               ts16               linestatus
  loopback           show
```

These commands are not available locally on an ASX-200WG nor on an LE 155 switch.

1.12.7.1 Enabling/Disabling CES on a Port

This command lets you enable or disable Circuit Emulation Services (CES) on a particular E1 CES port. Enter the following:

```
myswitch::configuration port cese1> admin <port> (up | down)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which CES is to be enabled or disabled.
up | down	Indicates whether CES is to be enabled or disabled on the selected port. **up** means that CES will be enabled. **down** means that CES will be disabled.

1.12.7.2 Configuring CRC4 Framing on an E1 CES Port

This command lets you change the CRC4 framing type on a E1 CES port. This command lets you specify whether or not the E1 CES port performs a CRC4 error check. Enter the following:

```
myswitch::configuration port cese1> crc4 <port> (ON | OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which the CRC4 framing type is being changed.
ON | OFF	**OFF** means that CRC4 error checking is disabled on this port. **OFF** is the default. **ON** means that CRC4 error checking is enabled on this port.

1.12.7.3 Reserving TS16 for Signalling on an E1 CES Port

This command lets you specify whether or not time slot 16 (TS16) is reserved for signalling information on a E1 CES port. Enter the following:

```
myswitch::configuration port cese1> ts16 <port> (ON | OFF)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which TS16 is being changed.
ON | OFF	**OFF** means that time slot 16 is used as another data channel on this port. **ON** means that time slot 16 is reserved for signalling information. **ON** is the default.

1.12.7.4 Displaying E1 CES Port Line Status

This command lets you display the current line status of each E1 CES port. Enter the following:

```
myswitch::configuration port cese1> linestatus
           Rx  Tx  Rx  Tx                    TS16 FarEndTx  NearEndTx NearEnd
Port Alarm LOF LOF AIS AIS LOF LOS Loopback AIS  TS16LOMF  TS16LOMF  TestCode
3C1  no    no  no  no  no  no  no  off      no   no         no        No code
3C2  no    no  no  no  no  no  no  off      no   no         no        No code
3C3  no    no  no  no  no  no  no  off      no   no         no        No code
3C4  no    no  no  no  no  no  no  off      no   no         no        No code
3C5  no    no  no  no  no  no  no  off      no   no         no        No code
3C6  no    no  no  no  no  no  no  off      no   no         no        No code
```

The fields in this display are defined as follows:

Field	Description
Port	The E1 CES port.
Alarm	Indicates whether or not the port is experiencing an alarm condition.
Rx LOF	Indicates whether or not the port is receiving a Loss of Frame (LOF) signal from the far end.
Tx LOF	Indicates whether or not the port is transmitting a Loss of Frame (LOF) signal.
Rx AIS	Indicates whether or not the port is receiving an Alarm Indication Signal (AIS).
Tx AIS	Indicates whether or not the port is transmitting an Alarm Indication Signal (AIS).
LOF	Indicates whether or not the port is experiencing Loss of Frame (LOF).
LOS	Indicates whether or not the port is experiencing Loss of Signal (LOS).
Loopback	Indicates whether or not the port is in loopback mode.
TS16 AIS	Indicates whether AIS is being received in timeslot 16.
FarEndTx TS16LOMF	Indicates whether Loss Of Multiframe (LOMF) is being indicated at the far end in Timeslot 16.
NearEndTx TS16LOMF	Indicates that the port is experiencing a Loss Of Multiframe (LOMF) condition in timeslot 16.
NearEnd TestCode	Indicates that the port is currently transmitting a test pattern.

1.12.7.5 Configuring E1 CES Port Loopback

This command lets you designate the type of loopback on an E1 CES port. Enter the following:

```
myswitch::configuration port cese1> loopback <port> (line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The E1 CES port on which the loopback mode is to be changed.
line	**line** loopback connects the transmitter to the receiver. The data stream received from the Rx line is retransmitted out to the Tx line. Cells that are switched to this port are not sent over the line.
none	**none** designates that no loopback will take place. This is the default setting.

1.12.7.6 Displaying the E1 CES Port Configuration

This command lets you display the current configuration of each E1 CES port. Enter the following:

```
myswitch::configuration port cese1> show
Port      Framing Carrier Line Loopback Port    Line Signalling Line
          Mode    State   Coding State  Timing  Imp. Mode       Status
3C1  up   CRC     yes     HDB3 none     internal 120  none       1
3C2  up   CRC     yes     HDB3 none     internal 120  none       1
3C3  down CRC     yes     HDB3 none     internal 120  none       1
3C4  down CRC     yes     HDB3 none     internal 120  none       1
3C5  down CRC     yes     HDB3 none     internal 120  none       1
3C6  down CRC     yes     HDB3 none     internal 120  none       1
```


The fields in this display are defined as follows:

Field	Description
Port	The E1 CES port number and the state of the port (**up** or **down**).
Framing Mode	The type of framing used on the line.
Carrier State[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Line Coding	The type of line coding used on the port.
Loopback State	The loopback mode on the port.
Port Timing	The source of the timing on this port. The values are one of: <BNP> indicating the board / network module / port from which the timing is being extracted, **srts** indicating that srts is being used on this port, **fabric** *<X>* where *X* is 1, 2, 3, or 4 indicating that timing is being sourced from another switch fabric (only applicable to an ASX-1000 or TNX-1100), **network** indicating that the clock is being derived from the line itself, or **crystal** indicating that the crystal on the network module itself is being used.
Line Imp.	The value of the line impedance (in ohms, either **75** or **120**).
Signalling Mode	The type of signalling used on the line.
Line Status	The line status of the E1 CES port.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

1.12.8 Configuring Port Delay

This command lets you specify the amount Cell Delay Variation and the maximum Cell Transfer Delay that is introduced by the hardware on the input or output side of a given port.

This command is only useful if you are running PNNI on your switch and if you want to specify how much delay will be introduced at a given port. The PNNI router can use this information in determining the best hop-by-hop route to take. However, the CDV and maximum CTD are automatically calculated for you by the switch, so if these conditions are not represented in your network, it is highly recommended that you leave these values at the default settings.

```
myswitch::configuration port> delay <port> <input | output> (default | <cdv> <maxctd>)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the CDV and CTD are being set.
input | output	**input** means the modified values apply to the input side of the port. **output** means the modified values apply to the output side of the port.
default	Resets the CDV and CTD to the default values.
cdv	The new value for Cell Delay Variation on this port, in microseconds. The default is 1 microsecond.
maxctd	The new value for Cell Transfer Delay on this port, in microseconds. The default is 21 microseconds.

1.12.9 DS1 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on a DS1 network module. The following DS1 commands are available only when a DS1 network module is installed in the switch fabric. To list the available subcommands, type **?** at the **ds1** level.

```
myswitch:: configuration port ds1> ?
  emptycells          length              loopback            mode
  prbs                scrambling          show                timing
```


1.12.9.1 Configuring DS1 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a DS1 network module port. Enter the following parameters:

```
myswitch::configuration port ds1> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.9.2 Configuring DS1 Port Line Length

This command lets you change the line length of a DS1 port to correspond to the physical cable attached to that port. This lets the DS1 network module receive the signal on the cable.

Check the unit Series, Revision, and Part numbers. To check the Series and Revision numbers, use the **`conf mod show`** command and look under the `Series` and `Rev.` fields, respectively. To check the Part number (ACCA####), remove the network module from the switch, and look at either the right edge of the top of the printed circuit board, or the top of the rear connector.

Series C, Revision 2, network modules with ACCA0055 part numbers should use ONLY the parameters that are appended with an A (e.g., Lt110A) in the table below.

To select the appropriate port line length, enter the following parameters:

`myswitch::configuration port ds1>` **`length`** *<port>* (**`Lt110`** | **`110-220`** | **`220-330`** | **`330-440`** | **`440-550`** | **`550-660`** |**`Gt655`** | **`Lt110A`** | **`110-220A`** | **`220-330A`** | **`330-440A`** | **`440-550A`** | **`550-660A`** | **`Gt655A`**)

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt110	Use if the physical cable is shorter than 110 ft.
110-220	Use if the physical cable is between 110 and 220 ft.
220-330	Use if the physical cable is between 220 and 330 ft.
330-440	Use if the physical cable is between 330 and 440 ft.
440-550	Use if the physical cable is between 440 and 550 ft.
550-660	Use if the physical cable is between 550 and 660 ft.
Gt655[1]	Use if the physical cable is greater than 655 ft.
Lt110A	Use if the physical cable is shorter than 110 ft.
110-220A	Use if the physical cable is between 110 and 220 ft.
220-330A	Use if the physical cable is between 220 and 330 ft.
330-440A	Use if the physical cable is between 330 and 440 ft.
440-550A	Use if the physical cable is between 440 and 550 ft.
550-660A	Use if the physical cable is between 550 and 660 ft.
Gt655A	Use if the physical cable is greater than 655 ft.

1. The DS1 network module is designed to meet all applicable requirements up to 655 feet of cable. Operation with cables greater than 655 feet in length is not guaranteed.

1.12.9.3 Configuring DS1 Port Loopback

This command lets you designate the type of loopback on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> loopback <port> (line | payload | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line | payload | diag | none	**Line** connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. **Payload** means the DS1 stream received from the network has the DS1 overhead bits re-inserted and is retransmitted to the network. **Diagnostic** connects the receiver to the transmitter. The DS1 stream transmitted by the SCP to a port is looped back to the SCP. The stream is still transmitted over the cable, but the incoming stream is ignored. **none** means no loopback will take place on this port. The default is **none**.

1.12.9.4 Configuring DS1 Port Mode

This command allows you to change the mode of operation on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp | hcs	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. **hcs** means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is **hcs**.

1.12.9.5 Configuring Pseudo-Random Bit Sequence Generation

This command allows you to enable Pseudo-Random Bit Sequence (PRBS) generation on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> prbs <port> (off | on)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the PRBS is to be changed.
on | off	**on** means that PRBS is enabled on this port and the Pseudo-Random Bit Sequence Generator (PRSG) will provide an unframed 2^15-1 test sequence as defined in Recommendation O.151 on this port. **off** means that PRBS is disabled on this port. The default is **off**.

1.12.9.6 Configuring DS1 Port Scrambling

This command allows you to change the scrambling mode on a port on the DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **off**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

1.12.9.7 Showing the DS1 Port Configuration

This command allows you to display current information about all of the ports on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> show
Port Carrier Stat  Mode Framing Loopback Timing   PRBS Scram Length   EmptyCells
1A1  no      0x124 hcs  ESF     none     internal N/A  off   Lt110    unassigned
1A2  no      0x124 hcs  ESF     none     internal N/A  off   Lt110    unassigned
```


The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each E3 network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Stat	The DS1 line status of the port.
Mode	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. **hcs** means the port uses HCS (Header Check Sequence) cell delineation.
Framing	The type of framing used for the port. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. This is a read-only field.
Loopback	The loopback mode on the port. Can be: **none**, **line**, **payload**, or **diagnostic**.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
PRBS	**on** means that PRBS is enabled on this port and the Pseudo-Random Bit Sequence Generator (PRSG) will provide an unframed 2^15-1 test sequence as defined in Recommendation O.151. **off** means that PRBS is disabled on this port.
Scram	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
Length	The length of the physical cable that is attached to this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.9.8 Configuring DS1 Port Timing

This command lets you change the timing source on a port on a DS1 network module. Enter the following parameters:

```
myswitch::configuration port ds1> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

1.12.10 DS3 Port Configuration Commands

These commands let you modify various aspects of the configuration of the ports on a DS3 network module. The following DS3 commands are available only when a DS3 network module is installed in the switch fabric. You can display the list of available subcommands by typing **?** at the **ds3** level.

```
myswitch::configuration port ds3> ?
  emptycells          framing             length              loopback
  mode                scrambling          show                timing
```

1.12.10.1 Configuring DS3 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a DS3 network module port. Enter the following parameters:

```
myswitch::configuration port ds3> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.10.2 Configuring the DS3 Port Framing

This command allows you to designate the framing to be used on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> framing <port> (cchannel | cbit)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing is to be changed.
cchannel | cbit	The type of framing for the port. **cchannel** (clearchannel) means that standard M23 framing is used on this port. The default is **cbit** (cbitparity).

1.12.10.3 Configuring DS3 Port Line Length

This command lets you change the line length of a DS3 port to correspond to the physical cable attached to that port. Enter the following parameters:

```
myswitch::configuration port ds3> length <port> (Lt225 | Gt225)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt225	Use if the physical cable is shorter than 225 ft.
Gt225	Use if the physical cable is greater than 225 ft. This is the default.

1.12.10.4 Configuring the DS3 Port Loopback

This command lets you designate the type of loopback on a port on a DS3 network module. Enter the following parameters:

```
myswitch::conf port ds3> loopback <port> (cell | payload | diag | line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
cell	**cell** loopback means that the DS3 stream received from the network is unframed into ATM cells. The cells are reframed and transmitted back to the network.
payload	**payload** loopback mean the DS3 stream received from the network has the DS3 overhead bits re-inserted and is retransmitted to the network.
diag	**diagnostic** loopback connects the receiver to the transmitter. The DS3 stream transmitted by the switch to a port is looped back to the switch. The DS3 stream is still transmitted to the network, but the incoming DS3 stream is ignored.
line	**line** loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line.
none	**none** designates that no loopback will take place on this port. This is the default setting.

1.12.10.5 Configuring the DS3 Port Mode

This command allows you to change the framing mode on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing mode is to be changed.
plcp | hcs	**plcp** means the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. **hcs** means the port uses HCS (Header Check Sequence) based framing for cell delineation. The default is **hcs**.

1.12.10.6 Configuring the DS3 Port Scrambling

This command lets you change the scrambling mode on a port on the DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on[1] | off	**on** means that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port.

1. Only the payload of the ATM cells is scrambled.

1.12.10.7 Showing the DS3 Port Configuration

This command allows you to display current information about all of the ports on the DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> show
Port Carrier Status Mode Framing  Loopback Timing   Scrambling EmptyCells Length
1A1  yes     0x1    plcp cbit     none     internal off        unassigned Gt225
1A2  yes     0x1    plcp cbit     none     internal off        unassigned Gt225
```

The fields in this display are defined as follows:

Field	Description
Port	The DS3 port number of the network module(s) currently installed in the switch.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
Status	The DS3 line status of the port.
Mode	**Plcp** means the port uses PLCP (Physical Layer Convergence Protocol) framing for cell delineation. **Hcs** means the port uses HCS (Header Check Sequence) based framing for cell delineation.
Framing	The type of framing used for the port. Can be **cchannel** or **cbit**.
Loopback	The loopback mode on the port. Can be **cell**, **payload**, **diagnostic**, **line**, or **none**.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scrambling	**On** means payload scrambling is enabled on the port. **Off** means payload scrambling is disabled on the port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. Idle cells set the CLP bit = 1 and unassigned cells set the CLP bit = 0. Idle = invalid cell pattern and unassigned = unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.10.8 Configuring DS3 Port Timing

This command lets you change the timing source on a port on a DS3 network module. Enter the following parameters:

```
myswitch::configuration port ds3> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

1.12.11 E1 Port Configuration Commands

These commands allow you to modify the configuration of the ports on an E1 network module. These commands are available only when an E1 network module is installed in the switch fabric. To display the list of available subcommands, type **?** at the **e1** level.

```
myswitch::configuration port> e1 ?
  emptycells          length              loopback            mode
  scrambling          show                timing
```

1.12.11.1 Configuring E1 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on an E1 network module port. Enter the following:

```
myswitch::configuration port e1> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **idle**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.11.2 Configuring E1 Port Line Length

This command lets you change the line length of an E1 port to correspond to the physical cable attached to that port. This allows the E1 network module to receive the signal on the cable.

Check the unit Series, Revision, and Part numbers. To check the Series and Revision numbers, use the **`conf mod show`** command and look under the `Series` and `Rev.` fields, respectively. To check the Part number (ACCA####), remove the network module from the switch, and look at either the right edge of the top of the printed circuit board, or the top of the rear connector.

Series C, Revision 2, network modules with ACCA0055 part numbers should use ONLY the parameters that are appended with an A (e.g., Lt110A) in the table below.

To select the appropriate port line length, enter the following parameters:

`myswitch::configuration port e1>` **`length`** *<port>* (**`Lt110`** | **`110-220`** | **`220-330`** | **`330-440`** | **`440-550`** | **`550-660`** |**`G703-75`** | **`G703-120`**| **`Lt110A`** | **`110-220A`** | **`220-330A`** | **`330-440A`** | **`440-550A`** | **`550-660A`** | **`G703-75A`** | **`G703-120A`**)

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
Lt110	Use if the physical cable is shorter than 110 ft.
110-220	Use if the physical cable is between 110 and 220 ft.
220-330	Use if the physical cable is between 220 and 330 ft.
330-440	Use if the physical cable is between 330 and 440 ft.
440-550	Use if the physical cable is between 440 and 550 ft.
550-660	Use if the physical cable is between 550 and 660 ft.
G703-75	Use if the physical cable is a G703 standard 75 ohm coaxial line.
G703-120	Use if the physical cable is a G703 standard 120 ohm symmetrical line.
Lt110A	Use if the physical cable is shorter than 110 ft.
110-220A	Use if the physical cable is between 110 and 220 ft.
220-330A	Use if the physical cable is between 220 and 330 ft.
330-440A	Use if the physical cable is between 330 and 440 ft.
440-550A	Use if the physical cable is between 440 and 550 ft.
550-660A	Use if the physical cable is between 550 and 660 ft.
G703-75A	Use if the physical cable is a G703 standard 75 ohm coaxial line.
G703-120A	Use if the physical cable is a G703 standard 120 ohm symmetrical line.

1.12.11.3 Configuring E1 Port Loopback

This command lets you designate the type of loopback on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port e1> loopback <port> (line | payload | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line | payload | diag | none	**Line** loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. **Payload** loopback means the stream received from the network has the E1 overhead bits re-inserted and is retransmitted to the network. **Diagnostic** loopback connects the receiver to the transmitter. The E1 stream transmitted by the SCP to a port is looped back to the SCP. The stream is still transmitted over the cable, but the incoming stream is ignored. **none** means that no loopback will take place on this port. The default is **none**.

1.12.11.4 Configuring E1 Port Mode

This command allows you to change the method used for cell delineation on an E1 network module port. Enter the following parameters:

```
myswitch::configuration port e1> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp | hcs	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. **hcs** means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is **hcs**.

1.12.11.5 Configuring E1 Port Scrambling

This command allows you to change the scrambling mode on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port e1> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **on**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

1.12.11.6 Showing the E1 Port Configuration

This command lets you display information about all of the ports on E1 network modules. Enter the following parameters:

```
myswitch::configuration port e1> show
Port Carrier Stat  Mode   LineType Loopback Timing    Scram Length    EmptyCells
1C1  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
1C2  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
1C3  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
1C4  no      0x244 N/A    CRC      none     internal  on    Lt110     idle
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each E1 network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Stat	The E1 line status of the port.
Mode	**plcp** means that the port uses PLCP framing for cell delineation. **hcs** means that the port uses HCS cell delineation.
LineType	The variety of E1 line implementing this circuit. The type of circuit affects the number of bits per second that the circuit can reasonably carry, as well as the interpretation of the usage and error statistics. This parameter is read-only.
Loopback	The loopback mode on the port.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scram	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
Length	The length of the physical cable that is attached to this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.11.7 Configuring E1 Port Timing

This command lets you change the timing source on a port on an E1 network module. Enter the following parameters:

```
myswitch::configuration port e1> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

1.12.12 E3 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on an E3 network module. These commands are available only when an E3 network module is installed in the switch fabric. To list the available subcommands, type **?** at the **e3** level.

```
myswitch::configuration port> e3 ?
  emptycells          loopback            mode                scrambling
  show                timing
```

1.12.12.1 Configuring E3 Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on an E3 network module port. Enter the following:

```
myswitch::configuration port e3> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.12.2 Configuring the E3 Port Loopback

This subcommand allows you to designate the type of loopback on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> loopback <port> (cell | payload | diag | line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
cell | payload | diag | line | none	**cell** loopback means the E3 stream received from the network is unframed into ATM cells. The cells are then reframed and transmitted back to the network. **payload** loopback means the E3 stream received from the network has the E3 overhead bits re-inserted and is retransmitted to the network. **diagnostic** loopback connects the receiver to the transmitter. The E3 stream transmitted by the switch to a port is looped back to the switch. The E3 stream is still transmitted to the network, but the incoming E3 stream is ignored. **line** loopback connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line. **none** means that no loopback will take place on the port. The default is **none**.

1.12.12.3 Configuring E3 Port Mode

This command allows you to change the method used for cell delineation on an E3 network module port. Enter the following parameters:

```
myswitch::configuration port e3> mode <port> (plcp | hcs)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the framing type is to be changed.
plcp | hcs	**plcp** means that the port uses PLCP (Physical Layer Convergence Protocol) framing (G.751) for cell delineation. **hcs** means that the port uses HCS (Header Check Sequence) based framing (G.832) for cell delineation. The default is **hcs**.

1.12.12.4 Configuring E3 Port Scrambling

This command allows you to change the scrambling mode on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **on**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

1.12.12.5 Showing the E3 Port Configuration

This command allows you to display current information about an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> show
Port Carrier Status Mode Loopback Timing    Scrambling EmptyCells
1D1  no      0x58   hcs  none     internal  on         unassigned
1D2  no      0x58   hcs  none     internal  on         unassigned
1D3  no      0x58   hcs  none     internal  on         unassigned
1D4  no      0x58   hcs  none     internal  on         unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each E3 network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Status	The E3 line status of the port.
Mode	**plcp** means that the port uses PLCP framing for cell delineation. **hcs** means that the port uses HCS cell delineation.
Loopback	The loopback mode on the port.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scram	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.12.6 Configuring E3 Port Timing

This command lets you change the timing source on a port on an E3 network module. Enter the following parameters:

```
myswitch::configuration port e3> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

1.12.13 GCRA Policing Command

Generic Cell Rate Algorithm (GCRA) policing ensures that traffic is regulated at the ATM layer on the input side of the network. This command allows you to configure GCRA policing on a per-port / per-class basis for all CBR and / or VBR PVCs and / or SVCs. Enter the following parameters:

```
myswitch::conf port> gcrapolicing <port> (cbr|vbr) (allOn|allOff|svcOn|svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which GCRA policing is being configured.
cbr | vbr	The class of service for which you are configuring GCRA policing.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service arriving on this port are subjected to GCRA policing.
allOff	**allOff** means no connections (SVCs and PVCs) of the specified class of service arriving on this port are subjected to GCRA policing.
svcOn	**svcOn** means all SVCs of the specified class of service arriving on this port are subjected to GCRA policing. PVCs are policed based on their UPC contract. This is the default.
svcOff	**svcOff** means no SVCs of the specified class of service arriving on this port are subjected to GCRA policing. PVCs are policed based on their UPC contract.

For example, if you want all CBR SVCs and PVCs to be policed on port 2B4, enter the following parameters:

```
myswitch::conf port> gcrapolicing 2b4 cbr allOn
```

1.12.14 J2 Port Configuration Commands

These commands let you modify various aspects of the configuration of a J2 network module. The following J2 commands are available only when a J2 network module is installed in the switch fabric. To display the list of available subcommands, type **j2 ?** at the **port** level.

```
myswitch::configuration port> j2 ?
  emptycells         line           loopback            show
  timing
```

1.12.14.1 Configuring Empty Cells on a J2 Port

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a J2 network module port. Enter the following:

```
myswitch::configuration port j2> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.14.2 Configuring J-2 Port Line Length

This command enables you to change the line length of a J2 network module port. Enter the following parameters:

```
myswitch::configuration port j2> line <port> (short | long)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
short | long	The length of the physical cable attached to this port. If the line attached to the receive port has greater than 4 db of attenuation, then the line must be configured as **long**. If otherwise, then it must be configured as **short**. In general, if the cable is less than 20 feet, then configure the line as short.

1.12.14.3 Configuring J2 Port Loopback

This command lets you configure the loopback mode on a J2 port. Enter the following:

```
myswitch::configuration port j2> loopback <port> (line | diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
line	**line** connects the transmitter to the receiver. The data stream received from the line is retransmitted out to the line. Cells that are switched to this port are not sent over the line.
diag	**diagnostic** loopback connects the receiver to the transmitter. The J2 stream transmitted by the switch to a port is looped back to the switch. The J2 stream is still transmitted to the network, but the incoming J2 stream is ignored.
none	**none** designates that no loopback will take place on this port. This is the default setting.

1.12.14.4 Showing J2 Port Configuration

This command allows you to display information about the configuration of the ports on a J2 network module. Enter the following parameters:

```
myswitch::configuration port j2> show
Port Carrier Status LineLength   Loopback     Timing       EmptyCells
1C1  no      0xc0   short        none         internal     idle
1C2  no      0xc0   short        none         internal     unassigned
1C3  no      0xc0   short        none         internal     unassigned
1C4  no      0xc0   short        none         internal     unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The J2 port number of the network module(s) currently installed in the switch.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
Status	The J2 line status of the port.
LineLength	The length of the physical cable that is attached to this port. Can be **short** or **long**.
Loopback	The loopback mode on the port. Can be **diagnostic**, **line**, or **none**.
Timing	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.14.5 Configuring J2 Port Timing

This command lets you change the timing source on a port on a J2 network module. Enter the following parameters:

```
myswitch::configuration port j2> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

1.12.15 LED Port Configuration Commands

These commands let you configure the a model for the front panel LEDs on a Series C, Series LC, or a Series D SONET network module. You can display the list of available subcommands by typing **led ?** at the **port** level.

```
myswitch::configuration port> led ?
  model            show
```

1.12.15.1 LED Model Configuration

This command lets you select an LED model to use for setting the LED colors on a per-port basis on a SONET Series C, Series LC, or a Series D network module. Typically, the LAN LEDs blink when transmitting or receiving data on a port. Typically, the WAN LEDs illuminate solid green, unless an error condition exists on a port. Enter the following parameters:

```
myswitch::configuration port led> model <port> (lan1 | wan1 | lan2 | wan2)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which you want to configure an LED model.
lan1 | wan1	For these models, RED means a fault in the receive direction, YELLOW means a fault in the transmit direction (Line Remote Defect Indication), AUTO/GREEN means no fault. Only the receive LED color is changed. These models show only three states and do not reflect the status of the Path Alarm Indications and Path Remote Defect Indications. **lan1** is the default value for all network modules.
lan2 | wan2[1]	For these models, RED means a line fault, YELLOW means a path fault, and AUTO/GREEN means no fault. The transmit LED shows faults in the transmit direction and the receive LED shows faults in the receive direction. These models provide a unique LED color pattern for all six fault states that can be detected by SONET signalling.

1. For the lan2 and wan2 models, faults in the receive direction may make it impossible to detect certain faults in the transmit direction.

1.12.15.2 Displaying the LED Model Configuration

This command lets you display the LED models used for each port of a SONET Series C, Series LC, or Series D network module. Enter the following parameters:

```
myswitch::configuration port led> show
Port  Type            rxLED  txLED  Model
4B1   J2              red    auto   N/A
4B2   J2              red    auto   N/A
4B3   J2              red    auto   N/A
4B4   J2              red    auto   N/A
4C1   OC3             auto   auto   lan1
4C2   OC3             red    auto   lan1
4C3   OC3             red    auto   lan1
4C4   OC3             red    auto   lan1
4E1   ASX-BP          N/A    N/A    N/A
4E2   ASX-BP          N/A    N/A    N/A
4E3   ASX-BP          N/A    N/A    N/A
4CTL  ASX-CTL         N/A    N/A    N/A
```


The fields in this display are defined as follows:

Field	Description
Port	The port number of the network module(s) currently installed in the switch (fabric).
Type	The type of network module it is. ASX-BP are the intra-fabric ports on an ASX-1000 or TNX-1100. ASX-CTL is the control port.
rxLED	The color of the receive LED for this port. Can be **off**, **green**, **red**, **yellow**, or **auto**. **auto** means that the LED is under hardware control. Typically, hardware control means that the LED is normally dark with green blinks to indicate data traffic.
txLED	The color of the transmit LED for this port. Can be **off**, **green**, **red**, **yellow**, or **auto**. **auto** means that the LED is under hardware control. Typically, hardware control means that the LED is normally dark with green blinks to indicate data traffic.
Model	The LED models (**lan1**, **wan1**, **lan2**, or **wan2**) that has been assigned to this port.

You can also display the LED models for a single port. Enter the following:

```
myswitch::configuration port led> show [<port>]
myswitch::configuration port led> show 4c3
Port  Type            rxLED  txLED  Model
4C3   OC3             red    auto   lan1
```

1.12.16 Port Policing Configuration Command

This command lets you decide whether or not incoming traffic is GCRA policed on a given port. Enter the following parameters:

```
myswitch::configuration port> policing <port> (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which GCRA traffic policing is to be enabled or disabled.
enable | disable	**enable** means that GCRA traffic policing will take place on all incoming traffic on this port (depending on what has been configured using **conf port gcrapolicing** and using the **noGCRA** option in the **conf upc new** command). **disable** means that traffic policing will not take place on incoming traffic on this port (depending on what has been configured using **conf port gcrapolicing** and using the **noGCRA** option in the **conf upc new** command). The default is **enable**.

To enable or disable GCRA policing on incoming traffic on a per-port or on a per-class basis, it is recommended that you use the **conf port gcrapolicing** command instead of this command. To enable or disable GCRA policing on incoming traffic on a per-PVC basis for CBR and VBR connections, use the **noGCRA** option in the **conf upc new** command.

If you change the policing settings using this command, the switch issues a warning as shown in the following example:

```
myswitch::configuration port> policing 1b1 disable
This change will cause the GCRA policing state of all
connections on port 1b1, to be updated to allOff.
Are you sure you want to make this change? [n]?
```

1.12.17 Partial Packet Policing Command

When partial packet policing is enabled on a connection, the GCRA policer looks for AAL5 packet boundaries by checking for cells with an EOM indicator in their cell header. If the policer decides that a cell in the middle of the AAL5 packet is non-conforming, then all remaining cells in that AAL5 packet (up to, but not including the EOM cell) are considered non-conforming. This command lets you configure partial packet policing on a per-port / per-class basis for all CBR and / or VBR PVCs and / or SVCs. Enter the following parameters:

GCRA policing must be used on any connection on which partial packet policing is being implemented.

This command applies only to AAL5 connections.

The HDCOMP ASIC must be version 1 or greater to support AAL5 partial packet policing. To display the ASIC version, use the **`conf board show advanced`** command.


```
myswitch::configuration port> pppolicing <port> (cbr|vbr) (allOn|allOff|svcOn|svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which partial packet policing is being configured.
cbr | vbr	The class of service for which you are configuring partial packet policing.
allOn	**`allOn`** means all connections (SVCs and PVCs) of the specified class of service on this port are subjected to partial packet policing.
allOff	**`allOff`** means no connections (SVCs and PVCs) of the specified class of service on this port are subjected to partial packet policing.
svcOn	**`svcOn`** means all SVCs of the specified class of service on this port are subjected to partial packet policing. PVCs are policed based on their UPC contract. This is the default.
svcOff	**`svcOff`** means no SVCs of the specified class of service on this port are subjected to partial packet policing. PVCs are policed based on their UPC contract.

For example, to enable partial packet policing on all VBR SVCs on port 2B4, enter the following parameters:

```
myswitch::configuration port> pppolicing 2b4 vbr svcOn
```

1.12.18 Showing the Port Configuration

This command lets you display port information about all of the ports on an individual switch fabric or about just a specified port. To show general information about all of the ports, enter the following:

```
myswitch::configuration port> show
Port Carrier Admin  Mbps ATM-Rate   CDVT Policing VBROB BuffOB AIS/RDI  Model
1D1  no      up    155.0    149.8    250 enabled    100    100 disabled OC3
1D2  no      up    155.0    149.8    250 enabled    100    100 disabled OC3
1D3  no      up    155.0    149.8    250 enabled    100    100 disabled OC3
1D4  yes     up    155.0    149.8    250 enabled    100    100 disabled OC3
1CTL yes     up     80.0     80.0   5000 enabled    N/A    N/A disabled ASX-CTL
Note: ATM/OAM processing is disabled
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
Admin	The current state of this port. Can be **up** (on-line) or **down** (off-line).
Mbps	The capacity of this port's link in Mbps
ATM-Rate	The actual ATM cell rate of this port in Mbps.
CDVT	The default value for the cell delay variation tolerance setting in microseconds.
Policing	Shows whether traffic policing is enabled or disabled for this port.
VBROB	The bandwidth overbooking level configured on this port, specified as a percentage. The default is `100`, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.
BuffOB	The buffer overbooking level configured on this port, specified as a percentage. The default is `100`, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking.
AIS/RDI	**enabled** means that OAM cells are generated when AISs and RDIs are detected. This setting is overridden if the `ATM/OAM processing is disabled` message is shown at the bottom of the display. **disabled** means that OAM cells are not generated when AISs and RDIs are detected.
Model	The type of network module. For the control port, displays `ASX-CTL`.
ATM/OAM processing is disabled	Shows that OAM cell generation is disabled on all ports on this switch board, despite the **conf port aisrdi** settings. To return all ports on this board to their last port settings shown in the `AIS/RDI` field, use the **conf board oam enable** command. See Section 1.4.2 for more information.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

To list port information for just a specified port, (for example, port 1B1), enter the following parameters:

```
myswitch::configuration port> show 1B1
Port Carrier Admin  Mbps CellRate   CDVT Policing VBROB BuffOB AIS/RDI  Model
1B1  yes     up    155.0    149.8    250 enabled    100    100 disabled OC3
Note: ATM/OAM processing is disabled
```

The fields in this display are defined in the same manner as those in the previous example.

This command also lets you display advanced information about all of the ports. Enter the following parameters:

```
myswitch::configuration port> show [<port>] [advanced|tm]
myswitch::configuration port> show advanced
            Input                Output
Port    CDV         maxCTD    CDV         maxCTD
1B1     1           21        computed    computed
1B2     1           21        computed    computed
1B3     1           21        computed    computed
1B4     1           21        computed    computed
1D1     1           21        computed    computed
1D2     1           21        computed    computed
1CTL    0           0         computed    computed
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
Input CDV	The Cell Delay Variation on the input side of this port, in microseconds.
Input maxCTD	The Cell Transfer Delay on the input side of this port, in microseconds.
Output CDV	The Cell Delay Variation on the output side of this port, in microseconds. **computed** means that the switch has automatically determined this value.
Output maxCTD	The Cell Transfer Delay on the output side of this port, in microseconds. **computed** means that the switch has automatically determined this value.

This command also lets you display port traffic management information. Enter the following:

```
myswitch::configuration port> show [<port>] [advanced|tm]
myswitch::configuration port> show tm
                GCRA Policing  AAL5 PP Pol.   AAL5 Packet Discard   Tag All
Port  CAC       CBR    VBR     CBR    VBR     CBR    VBR    UBR     UBR
1A1   disabled  svcOn  svcOn   allOff allOff  svcOn  svcOn  svcOn   svcOff
1A2   enabled   svcOn  svcOn   allOff allOff  svcOn  svcOn  svcOn   svcOff
1A3   enabled   svcOn  svcOn   allOff allOff  svcOn  svcOn  svcOn   svcOff
1A4   enabled   svcOn  svcOn   allOff allOff  svcOn  svcOn  svcOn   svcOff
1CTL  enabled   svcOn  svcOn   allOff allOff  N/A    N/A    N/A     svcOff
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
CAC	**enabled** means CAC is active on this port (the default state). **disabled** means CAC is not active on this port.
GCRA Policing CBR	**allOn** means all CBR connections arriving on this port are subjected to GCRA policing. **allOff** means no CBR connections arriving on this port are subjected to GCRA policing. **svcOn** means all CBR SVCs arriving on this port are subjected to GCRA policing. **svcOff** means no CBR SVCs arriving on this port are subjected to GCRA policing. CBR PVCs are policed based on the state of their UPC contract.
GCRA Policing VBR	**allOn** means all VBR connections arriving on this port are subjected to GCRA policing. **allOff** means no VBR connections arriving on this port are subjected to GCRA policing. **svcOn** means all VBR SVCs arriving on this port are subjected to GCRA policing. **svcOff** means no VBR SVCs arriving on this port are subjected to GCRA policing. VBR PVCs are policed based on the state of their UPC contract.
AAL5 PP Pol. CBR	**allOn** means all AAL5 CBR connections are subjected to partial packet policing. **allOff** means no AAL5 CBR connections are subjected to partial packet policing. **svcOn** means all AAL5 CBR SVCs are subjected to partial packet policing. For AAL5 CBR PVCs, partial packet policing is performed based on the UPC contract of the connection. **svcOff** means no AAL5 CBR SVCs are subjected to partial packet policing. For AAL5 CBR PVCs, partial packet policing is enabled based on the UPC contract of the connection.
AAL5 PP Pol. VBR	**allOn** means all AAL5 VBR connections are subjected to partial packet policing. **allOff** means no AAL5 VBR connections are subjected to partial packet policing. **svcOn** means all AAL5 VBR SVCs are subjected to partial packet policing. For AAL5 VBR PVCs, partial packet policing is performed based on the UPC contract of the connection. **svcOff** means no AAL5 VBR SVCs are are subjected to partial packet policing. For AAL5 VBR PVCs, partial packet policing is enabled based on the UPC contract of the connection.

Field	Description
AAL5 Packet Discard CBR	**allOn** means all AAL5 CBR connections are subjected to packet discard. **allOff** means no AAL5 CBR connections are subjected to packet discard. **svcOn** means all AAL5 CBR SVCs are subjected to packet discard. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. **svcOff** means no AAL5 CBR SVCs are subjected to packet discard. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
AAL5 Packet Discard VBR	**allOn** means all AAL5 VBR connections are subjected to packet discard. **allOff** means no AAL5 VBR connections are subjected to packet discard. **svcOn** means all AAL5 VBR SVCs are subjected to packet discard. For VBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. **svcOff** means no AAL5 VBR SVCs are subjected to packet discard. For VBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
AAL5 Packet Discard UBR	**allOn** means all AAL5 UBR connections are subjected to packet discard. **allOff** means no AAL5 UBR connections are subjected to packet discard. **svcOn** means all AAL5 UBR SVCs are subjected to packet discard. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection. **svcOff** means no AAL5 UBR SVCs are subjected to packet discard. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.
Tag All UBR	**allOn** means all UBR connections are tagged as non-compliant (set to CLP=1). **allOff** means no UBR connections are tagged. **svcOn** means all UBR SVCs are tagged. UBR PVCs are tagged based on their UPC contract. **svcOff** means no UBR SVCs are tagged. UBR PVCs are tagged based on their UPC contract.

1.12.19 SONET Port Configuration Commands

These commands allow you to modify various aspects of the configuration of all of the ports on a SONET network module. The following SONET commands are available only when a SONET network module is installed in the switch fabric. You can display the list of available subcommands by typing **sonet ?** at the **port** level.

All 155 Mbps and 622 Mbps network modules use this same set of commands, regardless of whether they are singlemode, multimode, OC-3, OC-12, or UTP network modules.

```
myswitch::configuration port> sonet ?
  emptycells          loopback            mode                scrambling
  show                timing
```

1.12.19.1 Configuring SONET Port Empty Cells

Empty cells are cells that are sent as “filler” or place holders when there is no real data to send. By sending these cells, network modules that are synchronous in nature can keep an even flow of traffic moving so that distributed timing can work properly. This command lets you change the type of cells sent as empty cells on a SONET network module port. Enter the following parameters:

```
myswitch::configuration port sonet> emptycells <port> (idle | unassigned)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the type of empty cells is to be changed.
idle | unassigned[1]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned. The default is **unassigned**.

1. Refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

1.12.19.2 Configuring SONET Port Loopback

This command enables you to configure the type of loopback mode on a SONET port. Enter the following parameters:

```
myswitch::configuration port sonet> loopback <port> (line | diag | path | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the loopback mode is to be changed.
line	**Line** connects the transmitter to the receiver. The data stream received from the fiber is retransmitted out to the fiber. In line loopback, the port acts as if it were an optical repeater. Cells that are switched to this port are not sent over the fiber. This option is valid for all SONET network modules.
diag	**Diagnostic** connects the receiver to the transmitter. The SONET stream transmitted by the fiber to a port is looped back to the fiber. The stream is still transmitted over the fiber, but the incoming stream is ignored. This option is valid for all SONET network modules, except for Series C OC-12 network modules.
path	**path** means that the loopback point is between the TPOP and RPOP blocks and the transmit parallel stream is connected to the receive stream. This option is valid ONLY for Series C OC-12 network modules.
none	**none** means no loopback will take place on this port. The default is **none**.

1.12.19.3 Configuring SONET Port Mode

This command lets you designate the mode to be used on a SONET network module port. Enter the following parameters:

```
myswitch::configuration port sonet> mode <port> (sonet|sdh)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the mode is to be changed.
sonet | sdh	The mode of operation for this port. Can be **sonet** or **sdh**.

1.12.19.4 Configuring the SONET Port Scrambling

This command allows you to change the scrambling mode on a port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> scrambling <port> (on | off)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the scrambling mode is to be changed.
on | off[1]	**on** indicates that cell payload scrambling is enabled on this port. **off** means that cell payload scrambling is disabled on this port. Only the payload of the ATM cells is scrambled. The default is **on**.

1. The scrambling mode should be set to the same status on both the transmitting side and the receiving side.

1.12.19.5 Showing the SONET Port Configuration

This command lets you display information about the configuration of all of the ports on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> show
Port Width  Line Mode  Loopback Timing   Scrambling EmptyCells
1C1  sts3c  MM   sonet none     internal on         unassigned
1C2  sts3c  MM   sonet none     internal on         unassigned
1C3  sts3c  MM   sonet none     internal on         unassigned
1C4  sts3c  MM   sonet none     internal on         unassigned
1D1  sts12c MM   sonet none     N/A      on         unassigned
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each SONET network module currently installed in the switch fabric.
Width	The type of the SONET path. `sts3c` is 155.52 Mbps and `sts12c` is 622.08 Mbps. The SDH transmission rate STM-1 is equivalent to SONET rate STS-3 and STM-4 is equivalent to STS-12. This is a read-only field.
Line	The line type for this interface. The line type for optical SONET signals may be **SMSR** (155 Mbps single-mode short reach), **SMIR** (622 Mbps single-mode intermediate reach), **other** (155 Mbps single-mode long reach), or **MM** (155 Mbps or 622 Mbps multi-mode) fiber. For electrical interfaces, the line type is `UTP` (155 Mbps Unshielded Twisted Pair).
Mode	The mode of operation for this port. Can be **sonet** or **sdh**.

Field	Description
Loopback	The loopback mode on the port. Can be one of the following: **line**, **diagnostic**, **path**, or **none**.
Timing[1]	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.
Scrambling	**on** means that payload scrambling is enabled on this port. **off** means that payload scrambling is disabled on this port.
EmptyCells[2]	The type of cells this port sends for filler when the port is not sending data. **Idle** cells set the CLP bit=1 and **unassigned** cells set the CLP bit=0. Idle=invalid cell pattern and unassigned=unassigned.

1. The timing option displays N/A on all OC-12 network modules because they always use internal timing.
2. Please refer to page 57 of the ATM Forum 3.0 Specification for more information. In general, it is not necessary to change this parameter from the default setting.

You can also display information about an individual port. Enter the following parameters:

```
myswitch::configuration port sonet> show 4c1
Port Width  Line Mode  Loopback Timing   Scrambling EmptyCells
4C1  sts3c  MM   sonet none     internal on         unassigned
```

The fields in this display are defined in the same manner as those in the previous example.

This command also lets you display information about the section, line, path, and ATM status of all of the ports on the SONET network modules. Enter the following parameters:

```
myswitch::configuration port sonet> show status
Port Carrier Section Line Path Atm
4C1  yes     0x1     0x1  0x1  0x1
4C2  no      0x6     0x2  0xc  0x2
4C3  no      0x6     0x2  0xc  0x2
4C4  no      0x6     0x2  0xc  0x2
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each SONET network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.

Field	Description
Section	The Section Status of this interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are as follows: 1 - sonetSectionNoDefect 2 - sonetSectionLOS - Loss Of Signal was detected. LOS is declared when 20 +/- 3us of all zero patterns is detected. 4 - sonetSectionLOF - Loss Of Frame was detected. LOF is declared when an out-of-frame condition persists for 3ms.
Line	The Line Status of this interface. It is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are: 1 - sonetLineNoDefect 2 - sonetLineAIS - Line Alarm Indication Signal was detected. Line AIS is asserted when a 111 binary pattern is detected in bits 6, 7, 8 of the K2 byte for five consecutive frames. 4 - sonetLineRDI Line Remote Defect Indication was detected. RDI is asserted when a 110 binary pattern is detected in bits 6, 7, 8 of the K2 byte for five consecutive frames.
Path	Shows the Path Status of this interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions are as follows: 1 - sonetPathNoDefect 2 - sonetPathLOP - Path Loss Of Pointer was detected. Path LOP is declared when a “normal pointer value” is not found for eight consecutive frames. 4 - sonetPathAIS - Path Alarm Indication Signal was detected. Path AIS is asserted when an all ones pattern is detected in the pointer bytes (H1 and H2) for three consecutive frames. 8 - sonetPathRDI - Path RDI alarm has been detected. RDI alarm is declared when bit 5 of the path status byte is high for ten consecutive frames. 16 - sonetPathUnequiped - Path is not provisioned (idle). PathSignalLabel = hex 00. 32 - sonetPathSignalLabelMismatch - A received Path Signal Label mismatch. A received Signal Label is considered mismatched if it does not equal either the standard value for an ATM payload (hex13) or the value for an “equipped non-specific”payload (1 hex).
Atm	The ATM Status of the interface. The variable is a bit map represented as a sum, so it can represent multiple defects simultaneously. The various bit positions areas follows: 1 - sonetAtmNoDefect 2 - sonetAtmLCD - Loss of Cell Delineation was detected. LCD is declared when a “normal pointer value” is not found for eight consecutive frames.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

You can also display information about the status of an individual port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> show [<port>] [status]
myswitch::configuration port sonet> show 4c1 status
Port Carrier Section Line Path Atm
4C1  yes     0x1     0x1  0x1  0x1
```

The fields in this display are defined in the same manner as those in the previous example.

1.12.19.6 Configuring SONET Port Timing

This command lets you change the timing source on a port on a SONET network module. Enter the following parameters:

```
myswitch::configuration port sonet> timing <port> (network | internal)
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the line length is to be changed.
network | internal	The transmit clock for this port. **network** means that the clock that is recovered from the receive line of this port is used to drive the transmit line of this port. **internal** means that the internal clock is used to drive the transmit line of this port.

1.12.20 TAXI Port Configuration Commands

These commands let you modify the configuration of the ports on a TAXI network module. The following commands are available only when a TAXI network module is installed in the switch fabric. To list the available subcommands, type **taxi ?** at the **port** level.

```
myswitch::configuration port> taxi ?
loopback         show
```

1.12.20.1 Configuring TAXI Port Loopback

This command allows you to designate the type of loopback on a port on a TAXI network module. Enter the following parameters:

```
myswitch::configuration port taxi> loopback <port> (diag | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
diag	**diagnostic** loopback connects the receiver to the transmitter. The TAXI stream transmitted by the switch to a port is looped back to the switch. The TAXI stream is still transmitted to the network, but the incoming TAXI stream is ignored.
none	**none** designates that no loopback will take place on this port. This is the default setting.

1.12.20.2 Showing the TAXI Port Configuration

This command enables you to display current information about all of the ports on a TAXI network module. Enter the following parameters:

```
myswitch::configuration port taxi> show
Port       Carrier    State      Loopback
2A1        yes        up         none
2A2        no         down       none
2A3        no         down       none
2A4        no         down       none
2A5        no         down       none
2A6        no         down       none
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each network module currently installed in the switch fabric.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected.
State	The current state of this port. Can be **up** (on-line) or **down** (off-line).
Loopback	The loopback mode of this port. Can be either **none** or **diagnostic**.

1. A carrier is detected when a signal is applied to the receive side of the port. It does not guarantee that the signal is the proper frequency.

1.12.21 TP25 Port Configuration Commands

These commands allow you to modify various aspects of the configuration of the ports on a TP25 network module. The following **tp25** commands are available only when a TP25 network module is installed in the switch fabric. You can display the list of available subcommands by typing **tp25 ?** at the **port** level.

```
myswitch::configuration port> tp25 ?
  loopback         show
```

1.12.21.1 Configuring the TP25 Port Loopback

This subcommand allows you to designate the type of loopback on a port on a TP25 network module. Enter the following parameters:

```
myswitch::configuration port tp25> loopback <port> (line | none)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the loopback mode is to be changed.
line	**line** loopback, also known as remote loopback, causes received data to be transferred to the upstream system as well as to be looped back to the transmitter on this port.
none	**none** designates that no loopback will take place on this port. This is the default setting.

1.12.21.2 Showing the TP25 Port Configuration

This command allows you to display current information about a TP25 network module. Enter the following parameters:

```
myswitch::configuration port tp25> show
Port Carrier Media Loopback RxTiming
1A1  no      UTP   none     Yes
1A2  no      UTP   none     Yes
1A3  no      UTP   none     Yes
1A4  no      UTP   none     Yes
1A5  no      UTP   none     Yes
1A6  no      UTP   none     Yes
1B1  yes     UTP   none     Yes
1B2  yes     UTP   none     Yes
1B3  no      UTP   none     Yes
1B4  yes     UTP   none     Yes
1B5  no      UTP   none     Yes
1B6  yes     UTP   none     Yes
```

The fields in this display are defined as follows:

Field	Description
Port	The TP25 port number of the network module(s) currently installed in the switch.
Carrier[1]	**yes** means a carrier has been detected on this port. **no** means a carrier has not been detected on this port.
Media	The kind of physical medium connected to the TP25 interface. **UTP** means that it is Unshielded Twisted Pair.
Loopback	The loopback mode on the port. Can be either **line** or **none**.
RxTiming	Indicates whether or not the port is receiving an 8kHz timing sync marker. These markers can be used to derive an 8kHz signal that can be transmitted from all ports on the network module and back to the switch fabric (on switches that support timing features). **No** means the port is not receiving sync pulses. **Yes** means the port is receiving sync pulses.

1. A carrier is detected when a signal is applied to the receive side of the port, but it does not guarantee the signal is the proper frequency.

1.12.22 Port Traffic Configuration Commands

These commands enable you to configure various traffic management features on an individual port on a network module on the switch. You can display the list of available subcommands by typing **?** at the **traffic** level.

```
myswitch::configuration port traffic> ?
  c>              lc>             le>             d>
```

1.12.22.1 Configuring Port Traffic on Series C Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series C network module on the switch. You can display the list of available subcommands by typing **?** at the **c** level.

```
myswitch::configuration port traffic c> ?
  cdv             clp1            efci            qsize
  show
```

1.12.22.1.1 Configuring Cell Delay Variation on a Series C Network Module

On a Series C network module, there are two output queues that are 256 cells deep, by default, one for Constant Bit Rate (CBR) and one for Variable Bit Rate (VBR). The Cell Delay Variation (CDV) for CBR is calculated as the CBR cell queue depth (256 cells by default) multiplied by 1 cell time. The CDV for VBR is calculated as the VBR cell queue depth (256 cells by default) multiplied by 1 cell time plus the CBR CDV. The CDV also varies depending on the physical interface on which the link is running (e.g., a 155 Mbps connection versus a 45 Mbps connection). This command lets you set the maximum CDV on a worst case basis that cells for a specified output port and priority (CBR or VBR) should incur. This number is used to determine the size of the buffers reserved for CBR and VBR traffic. Enter the following parameters:

```
myswitch::configuration port traffic c> cdv <port> (CBR | VBR) <CDV in microseconds>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CDV is to be set.
CBR | VBR	Specifies if the CDV is for output CBR traffic or for output VBR traffic.
CDV[1]	In microseconds, the cell delay variation that an output cell experiences under the worst conditions.

1. The network module must be reset for this command to take effect.

1.12.22.1.2 Setting the CLP Threshold on a Series C Network Module

This command allows you to designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series C network module. Enter the following parameters:

```
myswitch::configuration port traffic c> clp1 <port> (CBR | VBR | ABR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1]	Specifies for which type of traffic (CBR, VBR, or ABR/UBR) the CLP threshold is being set.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.12.22.1.3 Configuring EFCI on a Series C Network Module

This command allows you to designate the cell buffer threshold over which Unspecified Bit Rate (UBR) and Available Bit Rate (ABR) cells have their explicit forward congestion indicator (EFCI) code point set on a Series C network module. When the EFCI code point is set, this signals congestion to downstream switch fabrics and flow control mechanisms. Once this threshold is surpassed, EFCI continues to be set until the queue empties. Enter the following parameters:

```
myswitch::configuration port traffic c> efci <port> (on | off) <threshold>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the EFCI threshold is to be set.
on | off	**on** means the EFCI is set when the threshold number is reached, signalling congestion. **off** means the EFCI is cleared when the threshold number is reached, indicating no congestion.
number of cells	The number of cells over which the UBR and ABR cells will have EFCI set. The default is 64 cells.

1.12.22.1.4 Configuring Port Queue Size on a Series C Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series C network module. Enter the following parameters:

```
myswitch::configuration port traffic c> qsize <port> (CBR | VBR | ABR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR | VBR | ABR[1]	Specifies for which type of traffic (CBR, VBR, or ABR/UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic designated in the previous parameter. The default is 256 cells.

1. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

1.12.22.1.5 Displaying Port Traffic on a Series C Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series C network modules. Enter the following:

```
myswitch::configuration port traffic c> show
                  CLP   EFCI   EFCI
 Port  Prio      Thrsh    On    Off   QSize     CDV
 1C1   ABR-UBR     256    64      1     256     N/A
 1C1   VBR         256   N/A    N/A     256    1449
 1C1   CBR         256   N/A    N/A     256     724
 1C2   ABR-UBR     256    64      1     256     N/A
 1C2   VBR         256   N/A    N/A     256    1449
 1C2   CBR         256   N/A    N/A     256     724
 1C3   ABR-UBR     256    64      1     256     N/A
 1C3   VBR         256   N/A    N/A     256    1449
 1C3   CBR         256   N/A    N/A     256     724
 1C4   ABR-UBR     256    64      1     256     N/A
 1C4   VBR         256   N/A    N/A     256    1449
 1C4   CBR         256   N/A    N/A     256     724
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series C network module installed in the switch fabric.
Prio[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
EFCI On	The value at which the EFCI is set (turned on) when the threshold number is reached, signalling congestion, for this port and priority.
EFCI Off	The value at which the EFCI is cleared (turned off) when the threshold number is reached, indicating no congestion, for port and priority.
Qsize	The reserved queue size for this port and priority.
CDV	The maximum cell delay variation for this port and priority, specified in microseconds.

1. The Series C network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you display port and priority traffic information for an individual port on a Series C network module. Enter the following parameters:

```
myswitch::configuration port traffic> show [<port>]

myswitch::configuration port traffic> show 1A3
                  CLP    EFCI    EFCI
 Port  Prio     Thrsh      On     Off    QSize      CDV
 1A3   ABR-UBR     55      64       1       55      N/A
 1A3   VBR         55     N/A     N/A       55        4
 1A3   CBR         55     N/A     N/A       55        2
```

The fields in this display are defined in the same manner as those in the previous example.

1.12.22.2 Configuring Port Traffic on Series LC Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series LC network module on the switch. You can display the list of available subcommands by typing **?** at the **lc** level.

```
myswitch::configuration port traffic lc> ?
  clp1              qsize             show
```

1.12.22.2.1 Setting the CLP Threshold on a Series LC Network Module

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series LC network module. Enter the following parameters:

```
myswitch::configura port traffic lc> clp1 <port> (CBR | VBR | ABR | UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.12.22.2.2 Configuring Port Queue Size on a Series LC Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series LC network module. Enter the following parameters:

```
myswitch::configur port traffic lc> qsize <port> (CBR | VBR | ABR| UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR | VBR | ABR[1]| UBR	Specifies for which traffic type (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

1.12.22.2.3 Displaying Port Traffic on a Series LC Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series LC network modules. Enter the following:

```
myswitch::configuration port traffic lc> show
              CLP
 Port  Prio  Thrsh  QSize
 1D1   ABR     256    256
 1D1   VBR     256    256
 1D1   CBR     256    256
 1D1   UBR     256    256
 1D2   ABR     256    256
 1D2   VBR     256    256
 1D2   CBR     256    256
 1D2   UBR     256    256
 1D3   ABR     256    256
 1D3   VBR     256    256
 1D3   CBR     256    256
 1D3   UBR     256    256
 1D4   ABR     256    256
 1D4   VBR     256    256
 1D4   CBR     256    256
 1D4   UBR     256    256
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LC network module installed in the switch fabric.
Prio[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

1. The Series LC network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic lc> show [<port>]
myswitch::configuration port traffic lc> show 1d1
              CLP
 Port  Prio  Thrsh  QSize
 1D1   ABR     256    256
 1D1   VBR     256    256
 1D1   CBR     256    256
 1D1   UBR     256    256
```

The fields in this display are defined in the same manner as those listed above. If there are no Series LC network modules in the fabric, then the following is displayed:

```
myswitch::configuration port traffic lc> show
No Series-LC port traffic configuration information available
```

1.12.22.3 Configuring Port Traffic on Series LE Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series LE network module on an LE 155 switch. You can display the list of available subcommands by typing **?** at the **le** level.

```
myswitch::configuration port traffic le> ?
  clp1              qsize             show
```

The **conf port traffic le** commands are only valid on an LE 155 switch.

1.12.22.3.1 Setting the CLP Threshold on a Series LE Network Module

This command lets you designate the CLP=1 threshold at which cells that have been tagged as non-conforming are dropped for a given traffic type on a specified port on a Series LE network module. Enter the following parameters:

```
myswitch::configura port traffic le> clp1 <port> (CBR | VBR | ABR | UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the CLP threshold.
number of cells	The number of cells in the buffer at which the specified traffic type drops CLP=1 cells. The default is 256 cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.12.22.3.2 Configuring Port Queue Size on a Series LE Network Module

This command enables you to designate the minimum queue size for a given type of traffic on a specified port on a Series LE network module. Enter the following parameters:

```
myswitch::configur port traffic le> qsize <port> (CBR | VBR | ABR| UBR) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum queue size is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the minimum queue size.
number of cells[2]	The queue size to be assigned to the traffic type designated in the previous parameter. The default is 256 cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

1.12.22.3.3 Displaying Port Traffic on a Series LE Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series LE network modules. Enter the following:

```
myswitch::configuration port traffic le> show
                CLP
 Port   Prio   Thrsh   QSize
 1A1    ABR      256     256
 1A1    VBR      256     256
 1A1    CBR      256     256
 1A1    UBR      256     256
 1A2    ABR      256     256
 1A2    VBR      256     256
 1A2    CBR      256     256
 1A2    UBR      256     256
 1A3    ABR      256     256
 1A3    VBR      256     256
 1A3    CBR      256     256
 1A3    UBR      256     256
 1A4    ABR      256     256
 1A4    VBR      256     256
 1B1    ABR      256     256
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series LE network module installed in the switch fabric.
Prio[1]	The traffic type for this port.
CLP Thrsh	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.
Qsize	The reserved queue size for this port and priority, in cells.

1. The Series LE network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic le> show [<port>]
myswitch::configuration port traffic le> show 1a1
              CLP
 Port  Prio  Thrsh  QSize
 1A1   ABR     256    256
 1A1   VBR     256    256
 1A1   CBR     256    256
 1A1   UBR     256    256
```

The fields in this display are defined in the same manner as those listed above. If there are no Series LE network modules in the fabric (i.e., this is not an LE 155 switch), then the following is displayed:

```
myswitch::configuration port traffic le> show
No Series-LE port traffic configuration information available
```

1.12.22.4 Configuring Port Traffic on Series D Network Modules

These commands enable you to configure various traffic management features on an individual port on a Series D network module on the switch. You can display the list of available subcommands by typing **?** at the **d** level.

```
myswitch::configuration port traffic d> ?
  altclpconfig     clpthresh        qsize            ratelimit
  scheduling       show
```

1.12.22.4.1 Configuring Alternate CLP Thresholds on a Series D Network Module

This command lets you apply the alternate per-connection CLP=1 or CLP=0+1 threshold for various classes of service. The alternate threshold is configured using the **conf module traffic d altclpthresh** command. This alternate threshold can then be applied per port for some, all, or none of these connections using this command. Enter the following parameters:

```
myswitch::configuration port traffic d> altclpconfig <port> (cbr | vbr | ubr) (allOn |
allOff | svcOn | svcOff)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the alternate CLP thresholds are being applied.
cbr | vbr | ubr	Specifies for which type of traffic (CBR, VBR, or UBR) the alternate CLP=1 or CLP=0+1 thresholds are being applied.
allOn	**allOn** means all connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP thresholds.
allOff	**allOff** means no connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP thresholds.
svcOn	**svcOn** means all SVCs of the specified class of service arriving on this port will use the alternate CLP thresholds. PVCs are based on their UPC contract flags.
svcOff	**svcOff** means no SVCs of the specified class of service arriving on this port will use the alternate CLP thresholds. PVCs are based on their UPC contract flags. This is the default.

1.12.22.4.2 Configuring the CLP Threshold on a Series D Network Module

This command lets you apply the CLP=1 and CLP=0+1 thresholds for a given traffic type on a specified port on a Series D network module. Enter the following parameters:

```
myswitch::configuration port traffic d> clpthresh <port> (cbr | vbr | abr | ubr) (clp1
| clp01) <threshold>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the CLP threshold is being applied.
cbr | vbr | abr [1] | ubr	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) the CLP=1 or CLP=0+1 threshold is being applied.
clp1	The threshold is being set for CLP=1 cells. Applying a CLP=1 threshold means that when the current cell count for this port and class is greater than this threshold, cells that have a CLP=1 are dropped. This threshold must be less than the clp01 threshold.
clp01	The threshold is being set for CLP=0+1 cells. Applying a CLP=0+1 threshold means that when the current cell count for this port and class is greater than this threshold, cells are dropped, regardless of their CLP bit. This threshold must be greater than the clp1 threshold.
threshold	The number of cells in the buffer at which the specified traffic type drops CLP=1 or CLP=0+1 cells. This number must be entered in multiples of 8. The maximum value is the size of cell memory. The default is 256 cells for CLP=1 cells and the size of cell memory for CLP=0+1 cells.

1. The Series D network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

1.12.22.4.3 Configuring Port Queue Size on a Series D Network Module

This command enables you to designate the minimum dedicated queue size for a given type of traffic on a specified port on a Series D network module. Enter the following parameters:

```
myswitch::configur port traffic d> qsize <port> (cbr | vbr | abr | ubr) <number of cells>
```

These parameters are defined as follows:

Parameter	Description
port	The port on which the minimum dedicated queue size is to be set.
CBR | VBR | ABR[1] | UBR	Specifies for which type of traffic (CBR, VBR, ABR, or UBR) to set the minimum dedicated queue size.
number of cells[2]	The queue size to be assigned to the traffic designated in the previous parameter. The default is 256 cells.

1. The Series D network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.
2. The network module must be reset for this command to take effect.

1.12.22.4.4 Configuring the Rate Limit on a Series D Network Module

This command lets you limit a given port to a specified amount of bandwidth, effectively setting a new logical line rate for the port. This command allocates that bandwidth to the rate controller. To free the allocated bandwidth, the option `disable` should be specified instead of the number of cells. Enter the following parameters:

```
myswitch::configuration port traffic d> ratelimit <port> (<cps> | disabled)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which you want to change the rate limit.
cps	The new cell rate for the port, in cells per second.
disabled	Indicates you want to reset the bandwidth to the default value.

You should not modify the rate limit to a value lower than the following values: for OC12 network modules - 15,183 cells / sec per port; for OC3 network modules - 3,796 cells / sec per port; and for DS3, E3, DS1, and E1 network modules - 1,898 cells / sec per port.

When you change the rate limit, the software will ask you if you want to update the configuration database. To abort the command, type **n** or press **<ENTER>**. If you wish to change the rate limit, enter **y** at the prompt as follows:

```
myswitch::configuration port traffic d> ratelimit 1a1 1412830
Changes to the rate limiting state of a port are stored in the configuration
database and do not take effect until the network module is reset. Do you want
to proceed with a change to the configuration database rate limiting entry for
this port?

Proceed with database update [n]? y
```

The switch will then calculate the rate limit and give you the closest value to your requested value that it can. It then responds with the actual rate that it will give you.

```
Actual rate limit is 1412829
```

You must reset the network module for this command to take effect, so the switch will then prompt you to reset the network module. If you wish to reset the network module, enter **y** at the prompt as follows:

```
Reset the network module [n]? y
```

1.12.22.4.5 Scheduling Port Traffic on a Series D Network Module

This command lets you schedule the way that traffic is serviced on the output side of a Series D network module for SVCs and PVCs. Enter the following parameters:

```
myswitch::configuration port traffic d> scheduling <port> svc (cbr | vbr) (roundrobin |
smoothed | guaranteed)
OR
scheduling <port> pvc (cbr | vbr) (perupc | roundrobin | smoothed | guaranteed)
```

These parameters are defined as follows:

Parameter	Description
port	The port on which you want to change the scheduling mode.
svc cbr	Indicates that this scheduling mode will apply to all CBR SVCs output on this port.
svc vbr	Indicates that this scheduling mode will apply to all VBR SVCs output on this port.
pvc cbr	Indicates that this scheduling mode will apply to all CBR PVCs output on this port.
pvc vbr	Indicates that this scheduling mode will apply to all VBR PVCs output on this port.
perupc	Indicates that the PVCs output on this port will use the scheduling mode configured by the UPC contract that is applied to them. The UPC contract can be configured using the **-scheduling** parameter under the **conf upc new** command. This option only applies to PVCs.
roundrobin	All service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs.
smoothed	All service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second.
guaranteed	This is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.

Multicast connections cannot be shaped using the rate controller (all multicasts use the round robin queues).

When using the Series D memory models (under **conf module traffic d setmodel**), models 1 and 4 limit you to a maximum of 8K connections in the rate controller; models 2 and 5 limit you to a maximum of 12K connections in the rate controller; and models 3 and 6 limit you to a maximum of 10K connections in the rate controller.

1.12.22.4.6 Displaying Port Traffic on a Series D Network Module

This command lets you display port and priority traffic information for all of the ports on all of the Series D network modules. Enter the following:

```
myswitch::configuration port traffic d> show
                  Queue   Thresholds
 Port     Class    Size   CLP0+1   CLP1
 1C1        ABR     256    15000    256
 1C1        VBR     256    15000    256
 1C1        CBR     256    15000    256
 1C1        UBR     256    15000    256
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
Class[1]	The traffic type for this port.
Queue Size	The reserved queue size for this port and priority, in cells.
CLP0+1 Threshold	The value at which cells are dropped for this port and priority, regardless of their CLP bit.
CLP1 Threshold	The value at which cells that have been tagged as non-conforming (CLP=1) are dropped for this port and priority.

1. The Series D network modules offer an ABR-ready ATM interface. A future *ForeThought* release will support ABR QoS operation on these interfaces. ABR options in the current release will apply in that *ForeThought* release.

This command also lets you show port and priority traffic information for an individual port. Enter the following parameters:

```
myswitch::configuration port traffic d> show [<port>]
myswitch::configuration port traffic d> show 1c1
                  Queue   Thresholds
 Port     Class    Size   CLP0+1   CLP1
 1C1        ABR     256    15000    256
 1C1        VBR     256    15000    256
 1C1        CBR     256    15000    256
 1C1        UBR     256    15000    256
```

The fields in this display are defined in the same manner as those listed above.

This command also lets you show advanced traffic information. Enter the following:

```
myswitch::configuration port traffic d> show [<port>] [advanced|scheduling]
myswitch::configuration port traffic d> show advanced
       Alt. CLP Thresh Config
 Port     CBR     VBR     UBR  RateLimit
 1C1   svcOff  svcOff  svcOff   disabled
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
Alt. CLP Thresh Config	Specifies for which type of traffic (CBR, VBR, or UBR) the alternate CLP=1 or CLP=0+1 threshold is set. **allOn** means all connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP threshold. **allOff** means no connections (SVCs and PVCs) of the specified class of service arriving on this port will use the alternate CLP threshold. **svcOn** means all SVCs of the specified class of service arriving on this port will use the alternate CLP threshold. All PVCs arriving on this port have the alternate threshold applied if their UPC contract specifies to do so. This is the default. **svcOff** means no SVCs of the specified class of service arriving on this port will use the alternate CLP threshold. All PVCs arriving on this port have the alternate threshold applied if their UPC contract specifies to do so.
RateLimit	Rate limit lets you limit a given port to a specified amount of bandwidth, effectively setting a new logical line rate for the port. If a number is displayed, this is the new cell rate for the port, in cells per second. If **disabled** is displayed, it means rate limit is not enabled on this port.

Additionally, you can show scheduling information. Enter the following parameters:

```
myswitch::configuration port traffic d> show scheduling
                SVC Scheduling              PVC Scheduling
 Port           CBR           VBR           CBR           VBR
 1C1     roundrobin    roundrobin        perupc        perupc
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers of each Series D network module installed in the switch fabric.
SVC CBR Scheduling	Indicates that this scheduling mode will apply to all CBR SVCs output on this port.
SVC VBR Scheduling	Indicates that this scheduling mode will apply to all VBR SVCs output on this port.
PVC CBR Scheduling	Indicates that this scheduling mode will apply to all CBR PVCs output on this port.
PVC VBR Scheduling	Indicates that this scheduling mode will apply to all VBR PVCs output on this port.
perupc	Indicates that the PVCs output on this port will use the scheduling mode configured by the UPC contract that is applied to them. The UPC contract can be configured using the **-scheduling** parameter under the **conf upc new** command. This option only applies to PVCs.
roundrobin	All service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs.
smoothed	All service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second.
guaranteed	This is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.

If there are no Series D network modules in the switch fabric, then the following is displayed:

```
myswitch::configuration port traffic d> show
No Series-D port traffic configuration information available
```

1.12.23 UBR Tagging Command

When UBR tagging is enabled on a connection, all cells on the connection are tagged by the policer so that they can be discarded using the CLP=1 threshold when congestion is experienced. This prevents UBR traffic on a given port from using an unfair amount of buffer resources on a network module. This command lets you tag cells on a per-port and per-connection basis for all UBR connections. Enter the following parameters:

```
myswitch::configuration port> ubrtagging <port> (allOn|allOff|svcOn|svcOff)
```


These parameters are defined as follows:

Parameter	Description
port	The port number on which UBR tagging is being configured.
allOn	**allOn** means all UBR connections (SVCs and PVCs) arriving on this port are subjected to UBR tagging.
allOff	**allOff** means no UBR connections (SVCs and PVCs) arriving on this port are subjected to UBR tagging.
svcOn	**svcOn** means all UBR SVCs arriving on this port are subjected to UBR tagging. PVCs are tagged based on their UPC contract. This is the default.
svcOff	**svcOff** means no UBR SVCs arriving on this port are subjected to UBR tagging. PVCs are tagged based on their UPC contract.

For example, to enable tagging on all UBR SVCs and PVCs on port 2B4, enter the following parameters:

```
myswitch::configuration port> ubrtagging 2b4 allOn
```

1.12.24 VBRBuffOB Port Configuration Commands

This command is an advanced option that allows you to set an output buffer overbooking level for VBR traffic on a particular port. The overbooking factors affect the amount of bandwidth that is associated with VBR connections. When a VBR connection is created or destroyed, a quantity of bandwidth is allocated / de-allocated from the port for the connection.

It is recommended that you reset the network module after making any modification to the port overbooking factors so that VBR bandwidth is accurately accounted for by the switch control software. (See Section 1.10.2 for more information about **`conf module reset`**.) A change to the overbooking factors that is not followed by a reset may result in an incorrect amount of bandwidth being de-allocated for any existing VBR connections when those connections are destroyed.

Enter the following parameters to modify the overbooking factor:

```
myswitch::configuration port> vbrbuffob <port> <percent>
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the buffer overbooking level for VBR traffic is to be configured. Overbooking cannot be configured on the control (CTL) port.
percent	The buffer overbooking level assigned to this path, specified as a percentage. Enter an integer value greater than or equal to `1`. The default is `100`, which means that no overbooking has been defined. Values less than `100` cause underbooking. Values greater than `100` denote overbooking. The maximum value is 32,767.

1.12.25 VBROB Port Configuration Commands

This command is an advanced option that allows you to set an output bandwidth overbooking level for VBR traffic on a particular port. The overbooking factors affect the amount of bandwidth that is associated with VBR connections. When a VBR connection is created or destroyed, a quantity of bandwidth is allocated / de-allocated from the port for the connection.

It is recommended that you reset the network module after making any modification to the port overbooking factors so that VBR bandwidth is accurately accounted for by the switch control software. (See Section 1.10.2 for more information about **`conf module reset`**.) A change to the overbooking factors that is not followed by a reset may result in an incorrect amount of bandwidth being de-allocated for any existing VBR connections when those connections are destroyed.

Enter the following parameters to modify the overbooking factor:

```
myswitch::configuration port> vbrob <port> <percent>
```

These parameters are defined as follows:

Parameter	Description
port	The port number on which the bandwidth overbooking level for VBR traffic is to be configured. Overbooking cannot be configured on the control (CTL) port.
percent	The bandwidth overbooking level assigned to this port, specified as a percentage. Enter an integer value from `1` to 32,767. The default is `100`, which indicates that no overbooking will occur. Values less than `100` cause underbooking. Values greater than `100` denote overbooking.

1.13 QOS Expansion Table Commands

These commands let you delete, create, or display information about Quality of Service (QOS) entries in the QOS expansion table. The QOS expansion table is used for translating the QOS class in an incoming connection setup request into parameterized QOS values for Cell Transfer Delay (CTD), Cell Delay Variation (CDV), and Cell Loss Ratio (CLR). Please refer to Section 6.5.2.3.5 of the ATM Forum PNNI Specification for more information.

Each entry in the expansion table is indexed by an index and a QOS class. The index is used for associating entries in the expansion table with signalling interfaces. The table contains 5 default entries with an index of 0. When a new signalling interface is created, an expansion table index will be associated with it. If no index is specified while creating the signalling interface, the default entries with index 0 will be used to associate this signalling interface with the QOS expansion table entries.

You can display the list of available subcommands by typing **?** at the **qos** level.

```
myswitch::configuration qos> ?
  delete           new              show
```

1.13.1 Deleting a QOS Expansion Table Entry

These commands let you delete an entry from the QOS expansion table. If a QOS expansion table is currently being used by one or more signalling interfaces or originating SPVCs, then the expansion entries in that table cannot be deleted. Also, the entries in the default QOS expansion table (index 0) cannot be deleted. Enter the following parameters:

```
myswitch::configuration qos> delete <QoSExpIndex> <QoSclass>
```

These parameters are defined as follows:

Parameter	Description
QosExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSclass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 through 4.

1.13.2 Creating a QOS Expansion Table Entry

These commands let you add an entry to the QOS expansion table. If an expansion entry is created without some of the values specified for some of the QOS classes, then it is assumed that any value is acceptable for all the parameters. If such a partially specified QOS expansion table is used to create a signalling interface or originating SPVC, then no new expansion entries can be added to this table. You will be able to add the unspecified expansion entries once all of the signalling interfaces and originating SPVCs referencing the partially specified table are deleted. Enter the following:

```
myswitch::configuration qos> new <QoSExpIndex> <QoSclass> [-name <name>]\
       [-fwdCtd <ctd(us) | any_value>]
        [-fwdCdv <cdv(us) | any_value>] [-backCdv <cdv(us) | any_value>]
        [-fwdClr <clr | any_value>] [-backClr <clr | any_value>]
```

These parameters are defined as follows:

Parameter	Description
QosExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSclass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 to 4.
-name <name>	An optional text string associated with this entry to help you identify it.
-fwdCtd <ctd(us) | any_value>	The maximum acceptable forward CTD value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying **any_value** or **16777215** means that you are willing to accept any amount of cell transfer delay. The default is **any_value**.
-fwdCdv <cdv(us)| any_value>	The maximum acceptable forward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying **any_value** or **16777215** means that you are willing to accept any amount of cell delay variation. The default is **any_value**.
-backCdv <cdv(us)| any_value>	The maximum acceptable backward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. Specifying **any_value** or **16777215** means that you are willing to accept any amount of cell delay variation. The default is **any_value**.
-fwdClr <clr| any_value>	The maximum acceptable forward CLR value to be used for this expansion. Can range from 1 to 15. **any_value** means that you are specifying that you are willing to accept any amount of cell loss. A CLR value of x means that you are specifying 10^{-x}; e.g., 5 means 10^{-5}. The default is **any_value**.
-backClr <clr| any_value>	The maximum acceptable backward CLR value to be used for this expansion. Can range from 1 to 15. **any_value** means that you are specifying that you are willing to accept any amount of cell loss. A CLR value of x means that you are specifying 10^{-x}; e.g., 5 means 10^{-5}. The default is **any_value**.

1.13.3 Displaying the QOS Expansion Table

These commands let you display the entries in the QOS expansion table. Enter the following:

```
myswitch::configuration qos> show
QoSExp QoS
Index Class  fCtd(us)  fCdv(us)  bCdv(us)     fClr     bClr Name
  0     0     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_0_expn
  0     1     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_1_expn
  0     2     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_2_expn
  0     3     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_3_expn
  0     4     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_4_expn
```

The fields in this display are defined as follows:

Field	Description
QoSExpIndex	The index into the QOS expansion table that is used to associate signalling interfaces with expansion table entries.
QoSClass	Specifies the QOS class that is to be expanded into parameterized QOS IEs. Can have a value of 0 to 4.
fCtd(us)	The maximum acceptable forward CTD value to be used for this expansion. Can range from 0 to 16777215 microseconds. **any_value** means that any amount of cell transfer delay is acceptable.
fCdv(us)	The maximum acceptable forward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. **any_value** means that any amount of cell delay variation is acceptable.
bCdv(us)	The maximum acceptable backward CDV value to be used for this expansion. Can range from 0 to 16777215 microseconds. **any_value** means that any amount of cell delay variation is acceptable.
fClr	The maximum acceptable forward CLR value to be used for this expansion. Can range from 1 to 15. A CLR value of x means 10^{-x}; e.g., 5 means 10^{-5}. **any_value** means that any amount of cell loss is acceptable.
bClr	The maximum acceptable backward CLR value to be used for this expansion. Can range from 1 to 15. A CLR value of x means 10^{-x}; e.g., 5 means 10^{-5}. **any_value** means that any amount of cell loss is acceptable.
Name	An optional text string associated with this entry to help you identify it.

You can also display information for a specific index or QOS class. Enter the following:

```
myswitch::configuration qos> show [<QoSExpIndex> [<QoSclass>]]
myswitch::configuration qos> show 0 3
QoSExp QoS
Index Class  fCtd(us)  fCdv(us)  bCdv(us)     fClr     bClr Name
  0     3     ANY_VAL   ANY_VAL   ANY_VAL  ANY_VAL  ANY_VAL def_class_3_expn
```

The fields in this display are defined in the same manner as those in the previous example.

1.14 QOS Extension Table Commands

These commands let you delete, create, or display information about Quality of Service (QOS) extension table entries. The QOS extension table is used to hold a set of QOS parameters of maxctd, maxcdv, and maxclr. When creating a VPT using the **conf vpt new** command, the external QOS contribution of an originating / terminating path for a certain traffic type can be specified by an index pointing to this table. You can display the list of available subcommands by typing **?** at the **qosext** level.

```
myswitch::configuration qosext> ?
  delete          modify          new             show
```


1.14.1 Deleting a QOS Extension Table Entry

This command allows you to delete a QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> delete <QoSExtIndex>
```

1.14.2 Modifying a QOS Extension Table Entry

This command allows you to modify a set of QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> modify <QoSExtIndex> [-maxctd <maxctd>]\
[-maxcdv <maxcdv>] [-maxclr <maxclr>]
```

1.14.3 Creating a QOS Extension Table Entry

This command lets you create a set of QOS extension table entry. Enter the following:

```
myswitch::configuration qosext> new <QoSExtIndex> <maxctd> <maxcdv> <maxclr>
```

The parameters for delete, modify, and new are defined as follows:

Parameter	Description
QoSExtIndex	The index number of the set of QOS extension parameters.
maxctd	The maximum cell transfer delay, in microseconds.
maxcdv	The maximum cell delay variation, in microseconds.
maxclr	The maximum cell loss ratio.

1.14.4 Displaying the QOS Extension Table

This command allows you to display the QOS extension table. Enter the following parameters:

```
myswitch::configuration qosext> show
 QoSExtIndex MaxCtd MaxCdv MaxClr
             (usec) (usec)
 1               10     10     10
 2               10     10     10
 3               10     10     10
 4               10     10     10
 5               10     10     10
 6               10     10     10
 7               10     10     10
 8               10     10     10
 9               10     10     10
```

The fields in this display are defined as follows:

Field	Description
QoSExtIndex	The index number of the set of QOS extension parameters.
MaxCtd	The maximum cell transfer delay, in microseconds.
MaxCdv	The maximum cell delay variation, in microseconds.
MaxClr	The maximum cell loss ratio.

You can also display QOS information about a specific index by entering the following parameters:

```
myswitch::configuration qosext> show [<QoSExtIndex>]
myswitch::configuration qosext> show 1
QoSExtIndex MaxCtd MaxCdv MaxClr
            (usec) (usec)
 1               10     10     10
```

If no QOS extension table has been created, then the following is displayed:

```
myswitch::configuration qosext> show
No Qos Extension information is available
```

1.15 Serial Port Configuration Commands

These commands let you manage an RS-232 serial port. You can display the list of available subcommands by typing **rs232 ?** at the **configuration** level.

```
myswitch::configuration> rs232 ?
  show              speed
```


1.15.1 Displaying Serial Port Information

This command allows you to show information about the configuration of the RS-232 serial port on the SCP. Type **show** at the **rs232 configuration** level to list the settings for the serial port. Enter the following parameters:

```
myswitch::configuration rs232> show [(A|B)]
```

These parameters are defined as follows:

Parameter	Description
A | B	The port letter of the serial port to be displayed. Port B is not available.

```
myswitch::configuration rs232> show
Port     Type        Speed   Flow     Bits   Stops      Parity
A        rs232        9600   none        8   one        none
```

The fields in this display are defined as follows:

Field[1]	Description
Port;	The physical port designation
Type	The signalling standard used.
Speed	The receive / transmit rate.
Flow	The type of flow control implemented on the given port.
Bits	The number of bit times in a single character.
Stops	The number of stop bits in a character frame.
Parity	The parity setting for the ports.

1. All of these fields are read-only.

1.16 Security Configuration Commands

These commands let you configure various security methods on a switch. You can display the list of available subcommands by typing **?** at the **security** level.

```
myswitch::configuration security> ?
  ipaccess>          login>           nsapfiltering>
```

1.16.1 IP Access Configuration Commands

These commands let you configure IP filtering at the control port of the switch to prevent unauthorized access to the switch. You can display the list of available subcommands by typing **?** at the **ipaccess** level.

```
myswitch::configuration security ipaccess> ?
accept          delete            ssr            lsr
all             show
```

These commands are only available to users who have admin privileges. See Section 1.16.1.7.5 for more information about admin privileges.

1.16.1.1 Configuring an Authorized IP Address

This command lets you create an entry in the table of authorized IP addresses from which IP packets will be accepted. The switch performs inbound filtering by determining if there is a match between the header source address and the table of authorized incoming IP addresses. If the addresses match, the packets are accepted, provided that they meet the requirements set up by the **conf security ipaccess ssr**, **lsr**, and **all** commands; otherwise, they are rejected. The table of authorized IP addresses, which can contain a maximum of 32 entries, will persist across a reboot. Enter the following parameters:

```
myswitch::configuration security ipaccess> accept <ipaddr> <mask>
```

By applying a mask to an IP address entry, you can specify a wild card range of allowable addresses. For example, an IP address of 163.26.54.6 with a mask of 255.255.255.255 means only address 163.26.54.6 is accepted against that entry. However, an IP address of 163.26.54.6 with a mask of 255.255.0.0 means addresses 163.26.*.* are accepted against that entry.

1.16.1.2 Deleting an Authorized IP Address

This command lets you delete an entry in the list of authorized IP addresses from which IP packets will be accepted. Enter the following parameters:

```
myswitch::configuration security ipaccess> delete <ipaddr> <mask>
```

These parameters for accept and delete are defined as follows:

Parameter	Description
ipaddr	The authorized incoming IP address.
mask	The mask that indicates the significant part of the incoming IP address to be used to find a matching address in the table of authorized addresses. A mask of 0.0.0.0 is a wild card that matches all addresses. A mask must have contiguous higher order 1 bits set to be valid; e.g., mask 255.255.0.128 is not valid, but 255.255.128.0 is valid.

CAUTION

If you delete all entries from the table of authorized IP addresses, be sure that the last entry you delete is the one that matches the address of the machine at which you are sitting. Otherwise, you will be locked out of the switch.

1.16.1.3 Rejecting/Accepting Strict Source Routed Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all strict source routed packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> ssr (allow | disallow)
```

1.16.1.4 Rejecting/Accepting Loose Source Routed Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all loose source routed packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> lsr (allow | disallow)
```

1.16.1.5 Rejecting/Accepting All Packets

This command lets you configure an IP filtering flag to specify whether the switch should accept or reject all IP packets. Enter the following parameters:

```
myswitch::configuration security ipaccess> all (allow | disallow)
```

The parameters for ssr, lsr, and all are defined as follows:

Parameter	Description
allow	Setting **ssr** to **allow** means that all incoming IP packets that are strict source routed are accepted, provided that they match an IP address in the table of authorized addresses. Setting **lsr** to **allow** means that all incoming IP packets that are loose source routed are accepted, provided that they match an IP address in the table of authorized addresses. Setting **all** to **allow** means that all incoming IP packets are accepted, provided that they match an IP address in the table of authorized addresses. Setting **all** to **allow** is the default setting.
disallow	Setting **ssr** to **disallow** means that all incoming IP packets that are strict source routed are rejected, even if they match an IP address in the table of authorized addresses. Setting **lsr** to **disallow** means that all incoming IP packets that are loose source routed are rejected, even if they match an IP address in the table of authorized addresses. Setting **all** to **disallow** means that all incoming IP packets are rejected, even if they match an IP address in the table of authorized addresses.

CAUTION

When the **all** flag is set to **disallow**, the only way you can access the switch is via the serial port.

Information about all rejected packets (except for rejected broadcast packets) can be sent to syslog by using the **debug trace filtering ipfilter on** command.

1.16.1.6 Displaying IP Access Information

This command lets you display information about the IP filters that have been configured.

```
myswitch::configuration security ipaccess> show
Accepting IP traffic from the following addresses:
IpAddress          Mask
198.24.65.2        255.255.255.255
204.19.95.89       255.255.255.0

Configuration Flags:
Flag               State
all                allow
ssr                allow
lsr                allow
```


The fields in this display are defined as follows:

Field	Description
IpAddress / Mask	The table of authorized incoming IP addresses and their corresponding masks, if applicable. The mask indicates the significant part of the incoming IP address to be used in finding a matching address in this table. A mask of 0.0.0.0 is a wild card that matches all addresses. The addresses in the table are accepted, unless specifically rejected by a policy set by one of the configuration flags. The table can contain a maximum of 32 entries.
Flag / State	If **ssr** is **allowed**, all incoming IP packets that are strict source routed are accepted, provided that they match an IP address in the table of authorized addresses. If **ssr** is **disallowed**, all incoming IP packets that are strict source routed are rejected, even if they match an IP address in the table of authorized addresses. If **lsr** is **allowed**, all incoming IP packets that are loose source routed are accepted, provided that they match an IP address in the table of authorized addresses. If **lsr** is **disallowed**, all incoming IP packets that are loose source routed are rejected, even if they match an IP address in the table of authorized addresses. If **all** is **allowed**, all incoming IP packets are accepted, provided that they match an IP address in the table of authorized addresses. If **all** is **disallowed**, all incoming IP packets are rejected, even if they match an IP address in the table of authorized addresses.

If an entry in the table is preceded by an asterisk (*), this means that the entry has been created via SNMP, but is not active yet. The switch will not change its filtering policy based on that entry until the entry has become active.

If no addresses have been configured in the table and no flags have been set to disallow packets, then something similar to the following is displayed:

```
myswitch::configuration security ipaccess> show
Accepting IP traffic from the following addresses:
 All IP source addresses are being accepted

Configuration Flags:
 Flag               State
 all                allow
 ssr                allow
 lsr                allow
```

CAUTION

When the IP address table is empty, all addresses are accepted. This is the default state. Therefore, it is recommended that at least one address be entered into the table. Otherwise, anyone may access the switch via the control port. The address you enter must be the address of the machine you are using. Otherwise, you will lock yourself out of the switch.

You can also display information about a specific IP address as follows:

```
myswitch::configuration security ipaccess> show [<ipaddr> [<mask>]]
myswitch::configuration security ipaccess> show 198.67.0.3

Table information for 198.67.0.3:
IpAddress          Mask
198.67.0.3         255.255.255.255
```

If that address is not in the table, then the following message is displayed:

```
No table information for 198.67.0.3 is available.
```

1.16.1.7 Login Userid Configuration Commands

These commands allow you to configure various login userids, to assign privilege levels to the userids, and to display information about the userids. To display the list of available subcommands, type **?** at the **login** level.

```
myswitch::configuration security login> ?
  backup            delete            finger            modify
  new               password          restore           securid>
  show              upriv             whoami
```

More information about userids and other methods of security can be found in the Network Configuration manual for your switch.

1.16.1.7.1 Backing Up the Login Userid File

This command lets you make a backup of the file that contains all of the login IDs and information. This command is only available to users with admin privileges. Enter the following:

```
myswitch::configuration security login> backup [<host>:]<full path to backup file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host to which the login file will be backed up.
full path to backup file	The full path name of the file to which the login file will be backed up.

If you have configured the transfer protocol to be FTP using **conf system protocol**, you only need to enter the command shown above to perform the file backup. After you enter the command shown above, you are prompted for the remote userid and password of the remote host to which you are backing up the file.

If you have configured the transfer protocol to be TFTP (this is the default) using **conf system protocol**, the remote host to which the file will be backed up must be running the TFTP server code. If you are unsure of how to do this, see the Installation and Maintenance manual for your switch.

If you are using TFTP to perform the login file backup, you must first create an empty file in the `/tftpboot` directory on the remote host to receive the file. Use the **`touch`** command to do this. Then, use the **`chmod`** command to change the permissions of that file so that it will let the switch write the backup login file to that file.

Perform the following steps to back up your login file:

1. First, telnet to your remote host and log in.
2. Enter the following commands in sequence:

```
cd  /tftpboot
touch <backup file name>
chmod 777 <backup file name>
```

3. Then exit from the telnet session.
4. Telnet to the switch and log into AMI.
5. Enter the following command:

```
conf security login backup <host>:/tftpboot/<backup file name>
```

You will receive a confirmation message that the backup was successful.

1.16.1.7.2 Deleting a Userid

This command lets you delete a current userid. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login> delete <userid>
```

These parameters are defined as follows:

Parameter	Description
userid	The userid that you want to delete. Use **`conf security login show`** to display a list of the current userids.

1.16.1.7.3 Enabling or Disabling Fingering

This command lets you enable or disable the finger mechanism which displays information about the user who is currently logged into the switch. This information includes: the userid of the person who is currently logged in, how long the person has been logged on, the IP address of the machine on which the person logged in, the amount of time the system has been idle, the current percentage of processor utilization, the minimum percentage of processor utilization, and the maximum percentage of processor utilization. Enter the following parameters:

```
myswitch::configuration security login> finger [(enable | disable)]
```


These parameters are defined as follows:

Parameter	Description
enable	Enables the finger mechanism. This allows you to view information about the user who is currently logged into the switch. To view this information, log in to a host that is attached to the switch. Then, run the finger command on the host using either the switch's IP address or name. For example: finger `169.144.21.8`.
disable	Disables the finger mechanism so that no information is displayed about the user who is currently logged into the switch. This is the default.

If you enter the **`finger`** command with no parameter specified, the current state of the finger mechanism is displayed as follows:

```
myswitch::configuration security login> finger
The finger port is disabled.
```

1.16.1.7.4 Modifying a Userid

This command lets you modify the authentication method, privileges, and/or login access of the current userids. This command fails if the specified userid does not exist. This command is only available to users with `admin` privileges. A user with `admin` privileges can change his own authentication method or login access; however, the change will not take effect until that user logs in again. A user with `admin` privileges can also change his own password and privilege level; these changes take effect immediately. Enter the following:

```
myswitch::configuration security login> modify <userid> [-auth (local | securid)]
       [-priv (admin | user)]
        [-access (all | network | serial | none)]
```

1.16.1.7.5 Creating a Userid

This command lets you create a userid. This command is only available to users with admin privileges. Enter the following parameters:

```
myswitch::configuration security login> new <userid> [-auth (local | securid)
       [-priv (admin | user)]
        [-access (all | network | serial | none)]
```

This command fails if the specified userid already exists. The switch software prompts you to assign a password to the userid, regardless of the authentication method used. Null local passwords are accepted. The switch does not echo your keystrokes when you enter the password. For example:

```
myswitch::configuration security login> new mktg -auth local -priv user -access network

  New local password: <new local password>
  Retype new local password: <new local password>

  New userid mktg created with local authentication, user privileges and network login
  access.
```

The parameters for modify and new are defined as follows:

Parameter	Description
userid	The name of the userid that you want to create/modify. The maximum size is 16 characters. Any characters are allowed, except the colon (:) character and a blank return.
-auth (local | securid)	The authentication method for this userid. **local** means that the correct local password for this userid must be supplied to log in to a switch. **securid** means that the correct SecurID passcode must be supplied to log into a switch. There are some exceptions. See the Network Configuration manual for your switch for more information about these authentication methods and the exceptions. The default is **local**.
-priv (admin | user)	The privilege level for this userid. **admin** means a person with this userid is allowed to use all AMI commands. **user** means a person with this userid can use all AMI commands, except the following: **conf security login backup**, **conf security login delete**, **conf security login modify**, **conf security login new**, **conf security login password** (to modify passwords other than your own), **conf security login restore**, **conf security login show**, all **conf security login securid** commands, all **conf security ipaccess** commands, all **conf security nsapfiltering** commands, **conf snmp sets**, and all **debug** commands. The default is **admin**.
-access (all | network | serial | none)	A person with the userid **serial** is allowed to login only via the serial port. A person with the userid **network** is allowed to login only via telnet. A person with the userid **all** is allowed to login via the serial port and via telnet. A person with the userid **none** is not allowed to log in to the switch at all. The default is **all**.

1.16.1.7.6 Setting or Changing a Password for a Userid

This command lets you set or change the local password for a userid. This command replaces the **oper password** command. Enter the following parameters:

```
myswitch::configuration security login> password [<userid>]
```

When the password is changed, the old password must be entered correctly before a new password can be entered. However, a user logged in with admin privileges can change any userid password without first entering the old local password, except their own. For example:

```
myswitch::configuration security login> password mktg
  Old local password: <old local password>
  New local password: <new local password>
  Retype new local password: <new local password>
```

These parameters are defined as follows:

Parameter	Description
userid	The userid for which you want to set or change the local login password. If no userid is entered, the local userid is assumed to be the one for which you are setting or changing the password. The maximum size is 16 characters. Any characters are allowed, except the colon (:) character.

1.16.1.7.7 Restoring the Login File

This command allows you to restore the login file after you have backed it up. This command is only available to users with admin privileges. Enter the following parameters:

```
myswitch::configuration security login> restore [<host>:]<full path to restore file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host on which the login file that is to be restored resides.
full path to backup file	The full path name of the login file that is to be restored.

If you have configured the transfer protocol to be FTP using **conf system protocol**, you only need to enter the command shown above to perform the login file restore. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file.

If you have configured the transfer protocol to be TFTP (this is the default) using **conf system protocol**, the remote host from which the file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see the Installation and Maintenance manual for your switch.

1.16.1.7.8 Configuring SecurID

These commands let you configure SecurID on a switch. This means that all users who have their authentication method configured as `securid` will be validated by the SecurID server when they attempt to log in to that switch. You must have a SecurID server running in order to use these commands. For more information about SecurID, see the Network Configuration manual for your switch. To display the list of commands, type **`securid ?`** at the **`login`** level.

```
myswitch::configuration security login> securid ?
  getconf          delete           showconf
```

1.16.1.7.8.1 Getting the SecurId Configuration File

If you have SecurID enabled on a switch, this command lets you retrieve the SecurID configuration file which contains information that the SecurID server and the switch need to communicate with each other. Enter the following parameters:

```
myswitch::configur security login securid> getconf <host>:<full path to sdconf.rec file>
```

These parameters are defined as follows:

Parameter	Description
host	The IP address of the host on which the SecurID file resides.
full path to sdconf.rec file	The full path name of the SecurID file that is to be restored.

If you have configured the transfer protocol to be FTP using **`conf system protocol`**, you only need to enter the command shown above to retrieve the configuration file. After you enter the command shown above, you are prompted for the remote userid and password of the remote host from which you are retrieving the file.

If you have configured the transfer protocol to be TFTP (this is the default) using **`conf system protocol`**, the remote host from which the file will be retrieved must be running the TFTP server code. If you are unsure of how to do this, see the Installation and Maintenance manual for your switch.

1.16.1.7.8.2 Deleting a SecurID File

This command lets you delete either the SecurID configuration file (sdconf.rec) or the node secret file. The configuration file contains information that the SecurID server and the switch need to communicate with each other. The node secret file is a string of about 16 bytes that the switch receives the first time it contacts the server. This string, which is known only to the server and this switch, is used in encrypting messages between the server and the switch. Both of these files are stored in the FLASH. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login securid> delete (conf | secret)
```


These parameters are defined as follows:

Parameter	Description
conf	Indicates the SecurID configuration file (sdconf.rec) is to be deleted from FLASH.
secret	Indicates the node secret file is to be deleted from FLASH.

1.16.1.7.8.3 Displaying the SecurID File

This command lets you display the contents of the SecurID configuration file. However, if you wish to edit the file, you must do so on the server machine. Then you must use the **`conf security login securid get`** command to retrieve the new file. When you use this command, it overwrites the existing file. Enter the following parameters:

```
myswitch::configuration security login securid> showconf
SecurID Client Configuration

ACE/Server VERSION: v 2.1.104
CLIENT RETRY: 5 times
CLIENT TIMEOUT: 5 sec
BAD PASSCODES: 3
DES ENCRYPTION: allowed and enabled
DURESS MODE: not allowed
MASTER SERVER: linus
MASTER SERVER ADDRESS: 204.95.89.107
PORT NUMBER: 1024
AUTHENTICATION SERVICE: securid
```

If there is no file or if the file is damaged, the following is displayed:

```
myswitch::configuration security login securid> showconf
Securid configuration file does not exist or is corrupted.
```

1.16.1.7.9 Displaying Userid Information

This command lets you display all of the current userids and their assigned authentication methods, privilege levels, and login access levels. This command is only available to users with `admin` privileges. Enter the following parameters:

```
myswitch::configuration security login> show
                Authentication                    Login
Userid          Method          Privileges        Access
-------------------------------------------------------
1234567890123456 local          user              all
ami             local           admin             all
is&s            local           admin             all
marketing       securid         user              network
```

The fields in this display are defined as follows:

Field	Description
Userid	The userids currently available on this switch. The **asx** userid no longer an alias for **ami**. When you first upgrade to *ForeThought* 5.0.x, the switch software creates two separate default userids: **ami** and **asx**. Both are configured with `local` authentication, `admin` privileges, and `all` access. If a *ForeThought* 4.1.x password file already existed, both userids are assigned that same password. If a *ForeThought* 4.1.x password file did not exist, both userids are assigned a null password.
Authentication Method	The authentication method for this userid. **local** means that the correct local password for this userid must be supplied to log in to a switch. **securid** means that the correct SecurID passcode must be supplied to log into a switch. There are some exceptions. See the Network Configuration manual for your switch for more information about these authentication methods and the exceptions. The default is **local**.
Privileges	The privilege level for this userid. **admin** means a person with this userid is allowed to use all AMI commands. **user** means a person with this userid can use all AMI commands, except the following: **conf security login backup**, **conf security login delete**, **conf security login modify**, **conf security login new**, **conf security login password** (to modify passwords other than your own), **conf security login restore**, **conf security login show**, all **conf security login securid** commands, all **conf security ipaccess** commands, all **conf security nsapfiltering** commands, **conf snmp sets**, and all **debug** commands. The default is **admin**.
Login Access	A person with the userid **serial** is allowed to login only via the serial port. A person with the userid **network** is allowed to login only via telnet. A person with the userid **all** is allowed to login via the serial port and via telnet. A person with the userid **none** is not allowed to log in to the switch at all.

1.16.1.7.10 Displaying and Changing Unlisted User Privileges

This command allows you to display the privileges on the switch. To display this information, enter **upriv** at the **login** level.

```
myswitch::configuration security login> upriv
Unlisted users' privileges set to “admin”
```

This command also lets you change the privileges of any users who are not listed on the switch. To set or change this information, enter the following parameters:

```
myswitch::configuration security login> upriv [<admin|user>]
```

The fields in this display are defined as follows:

Parameter	Description
admin|user	If a user is not listed on the switch, but is authenticated by the SecurID server, then the user is assigned the privilege level that is configured here. **user** means all unlisted users logging to this switch are given user level privileges (the ability to access only a certain subset of the AMI commands). **admin** means all unlisted users logging to this switch are given admin level privileges (the ability to access all of the AMI commands). The default is **admin**.

1.16.1.7.11 Displaying the Current Userid

This command shows the userid of the user who is currently logged into the switch. Enter the following parameters:

```
myswitch::configuration security login> whoami
ami
```

1.16.1.8 Configuring NSAP Filtering

These commands provide a mechanism for filtering calls based on a combination of the calling (source) and called (destination) addresses, as well as the source ports, VPIs, NSAP addresses, and NSAP address masks, and the destination ports, VPIs, NSAP addresses, and NSAP address masks. To display the list of available subcommands, type **?** at the **nsapfiltering** level.

```
myswitch::configuration security nsapfiltering> ?
  filters>         templates>       interfaces>
```

More information about NSAP filtering and other methods of security can be found in the Network Configuration manual for your switch.

1.16.1.8.1 Configuring NSAP Filters

These commands allow you to configure NSAP filters. To display the list of available subcommands, type **?** at the **filters** level.

```
myswitch::configuration security nsapfiltering filters> ?
  add              delete           lookup           new
  show
```

1.16.1.8.1.1 Adding a Template to an NSAP Filter

This command lets you add a new template to a filter that already exists. It creates the filter, if the filter does not already exist. (To create a new filter, you can also use the **conf security nsapfiltering filters new** command.) Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> add <filter-id> <template-id>
[-before <template-id>]
```

The parameters for add are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A name may be up to 20 characters. Zero is not a valid index.
template-id	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A name may be up to 20 characters. Zero is not a valid index.
-before <template-id>	When adding a template to a filter, indicates that the template you are adding will be placed before the specified <*template-id*> in the filter's ordering scheme.[1] If this parameter is not specified, then the template is added to the end of the list in the filter.

1. When you specify **-before** <*template-id*>, the order in which the templates are listed in the filter will change as you add or delete more templates.

1.16.1.8.1.2 Deleting an NSAP Filter

This command lets you delete a template from a filter or delete an entire filter. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> delete <filter-id>
       (<template-id> | -all )
```

The parameters for delete are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A name may be up to 20 characters. Zero is not a valid index.
template-id | -all	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A name may be up to 20 characters. Zero is not a valid index. If <*template-id*> is specified, then only that template is deleted from the filter. If **-all** is specified, then the entire filter is deleted.

1.16.1.8.1.3 Testing Against an NSAP Filter

This command allows the user to enter components of a call setup message to test whether a call setup attempt with the supplied addresses and ports would be accepted or rejected by a specific filter. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> lookup <filter-id>
        [ -srcport <port> ] [ -srcvpi <vpi> ] -srcnsap <nsap>
        [ -dstport <port> ] [ -dstvpi <vpi> ] -dstnsap <nsap>
```

These parameters are defined as follows:

Parameter	Description
lookup <filter-id>	The filter against which you are testing the call setup message.
-srcport <port>	The source port of the call setup message.
-srcvpi <vpi>	The source virtual path number of the call setup message.
-srcnsap <nsap>	The source NSAP address of the call setup message.
-dstport <port>	The destination port of the call setup message.
-dstvpi <vpi>	The destination virtual path number of the call setup message.
-dstnsap <nsap>	The destination NSAP address of the call setup message.

The switch returns an answer of either `accepted` or `rejected`, and the template-id of the specific template that accepted or rejected the tested call setup message. If the message does not match any of the templates in the filter, the switch returns an answer of `rejected` and `address unknown`.

This command is simply a test. Therefore, if a message is rejected, it does not increment the address validation counters, enter the result in the table that shows the last failure, nor send a trap.

1.16.1.8.1.4 Creating an NSAP Filter

This command lets you create a new filter that contains the templates you specify in the order in which you specify them.

```
myswitch::configuration security nsapfiltering filters> new <filter-id> <template-id>
[<template-id>]*
```

The parameters for new are defined as follows:

Parameter	Description
filter-id	The unique, user-assigned identifier for this filter. A filter-id can be either a positive, decimal integer (index) or a string name. A name may be up to 20 characters. Zero is not a valid index. If the filter already exists, you receive an error message. If a name is specified without a numeric index, an index is assigned to the filter and shown to you.
template-id	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. A name may be up to 20 characters. Zero is not a valid index. The * in this command means that you can add as many template-ids to this filter as you wish.

1.16.1.8.1.5 Displaying NSAP Filter Information

This command lets you display all of the NSAP filters that have been configured on the switch. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> show
Index Name                Template IDs
  1                       1  2  48
  2                       3  256
  5   okay                let_these_in 15
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this filter.
Name	An optional, user-assigned name that identifies this filter.
Template IDs	The name or index number of each template in this filter. The templates are applied in the order in which they are listed in the filter.

You can also display an individual NSAP filter. If you specify **-templates**, then the templates in that filter are displayed as well. Enter the following parameters:

```
myswitch::configuration security nsapfiltering filters> show [<filter-id>]
[-templates]
myswitch::configuration security nsapfiltering filters> show 2 -templates
       Index Name                Template IDs
         2                      3  256
```

The fields in this display are defined in the same manner as those in the previous example.

If no NSAP filters have been configured, then the following message is displayed:

```
myswitch::configuration security nsapfiltering filters> show
No Address Filters are present
```

1.16.1.8.2 Configuring Templates

These commands allow you to configure the templates that are used in NSAP filters. To display the list of available subcommands, type **?** at the **templates** level.

```
myswitch::configuration security nsapfiltering templates> ?
  delete           new              modify           show
```

1.16.1.8.2.1 Deleting a Template

This command lets you delete a template that has not been added to any filter yet. If the template has already been added to one or more filters, then it must be deleted from each filter list using the **conf security nsapfiltering filters delete** *<template-id>* command. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> delete <template-id>
```

1.16.1.8.2.2 Creating a Template

This command lets you create a template. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> new <template-id>
        [-srcport <port>] [-srcvpi <vpi>]
        [-srcnsap <nsap>] [-srcmask <mask>]
        [-dstport <port>] [-dstvpi <vpi>]
        [-dstnsap <nsap>] [-dstmask <mask>]
        -action (accept | reject)
```

1.16.1.8.2.3 Modifying a Template

This command lets you modify individual items in a template. If the template is currently in use by a filter, then the changes take effect immediately. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> modify <template-id>
        [-srcport <port>] [-srcvpi <vpi>]
        [-srcnsap <nsap>] [-srcmask <mask>]
        [-dstport <port>] [-dstvpi <vpi>]
        [-dstnsap <nsap>] [-dstmask <mask>]
        [-action (accept | reject)]
        [-name <string> ]
```

If you apply an NSAP filter to a port connected to a LANE client, the client may still receive traffic from the blocked source indirectly, through the LANE BUS.

The parameters for delete, new, and modify are defined as follows:

Parameter	Description
template-id	The unique, user-assigned identifier for this template. A template-id can be either a positive, decimal integer (index) or a string name. If it is specified as a numerical index, then the Name field is left blank. Zero is not a valid index. A name may be up to 20 characters. If a name is specified without an index, the switch assigns a numerical index and shows it to you.
-srcport <port>	The source port of the call setup message. An asterisk (*) is a wild card that matches all ports.
-srcvpi <vpi>	The source virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.

Parameter	Description
-srcnsap <nsap>	The source NSAP address of the call setup message.
-srcmask <mask>	The mask that indicates the significant part of the source NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
-dstport <port>	The destination port of the call setup message. An asterisk (*) is a wild card that matches all ports.
-dstvpi <vpi>	The destination virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
-dstnsap <nsap>	The destination NSAP address of the call setup message.
-dstmask <mask>	The mask that indicates the significant part of the destination NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
-action <accept | reject>	The action to take with addresses that match this template. **accept** means that the call will be allowed and **reject** means that the call will not be allowed.
-name <string>	An optional, user-assigned name that helps to identify this template.

1.16.1.8.3 Displaying Template Information

This command lets you display all of the templates that have been configured on the switch. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> show
                                    Source              Destination
Index  Action  Name                 Port   VPI  Mask    Port   VPI  Mask
    1  accept  let_these_in         1A1      5   128    *        *  152
Source NSAP:      0x47.0005.80.ffe100.0000.f21a.3596.0020481a3596.f0
Destination NSAP: 0x47.0005.80.ffe100.0000.f21a.2a1d.0020481a2a17.00

    3  reject                       *        *   104   1CTL     *  152
Source NSAP:      0x47.0005.80.ffe100.0000.f215.11f2.0020487a3751.00
Destination NSAP: 0x47.0005.80.ffe100.0000.f215.11f2.00204825c418.00

    4  reject  keep_these_out       1A1      *   104   1CTL     *    0
Source NSAP:      0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00
Destination NSAP: *
```

The fields in this display are defined as follows:

Field	Description
Index	The unique index number that identifies this template.
Action	The action to take with addresses that match this template. **accept** means that the call is allowed and **reject** means that the call is not allowed.
Name	An optional, user-assigned name that identifies this template.
Source Port	The source port of the call setup message. An asterisk (*) is a wild card that matches all ports.
Source VPI	The source virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
Source Mask	The mask that indicates the significant part of the source NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.
Destination Port	The destination port of the call setup message. An asterisk (*) is a wild card that matches all ports.
Destination VPI	The destination virtual path number of the call setup message. An asterisk (*) is a wild card that matches all VPIs.
Destination Mask	The mask that indicates the significant part of the destination NSAP address to be used to find a matching address in the templates of authorized addresses. A mask of 0 is a wild card that matches all addresses.

Field	Description
Source NSAP	The source NSAP address of the call setup message. An asterisk (*) is a wild card that matches all NSAP addresses.
Destination NSAP	The destination NSAP address of the call setup message. An asterisk (*) is a wild card that matches all NSAP addresses.

You can also display an individual template. Enter the following parameters:

```
myswitch::configuration security nsapfiltering templates> show [<template-id>]
myswitch::configuration security nsapfiltering templates> show 3
                                    Source             Destination
Index  Action  Name                 Port   VPI  Mask   Port   VPI  Mask
    4  reject  keep_these_out       1A1      *   104   1CTL     *    0
Source NSAP:      0x47.0005.80.ffe100.0000.f215.11f2.002048100464.00
Destination NSAP: *
```

If no templates exist, then the following message is displayed:

```
myswitch::configuration security nsapfiltering templates> show
No Address Filtering Templates are present
```

1.16.1.8.4 Configuring NSAP Filter for Interfaces

These commands let you configure filters for incoming call setup requests and for outgoing call setup requests for ATM Forum signalling interfaces, such as UNI, NNI, IISP, etc. To display the list of available subcommands, type **?** at the **interfaces** level.

```
myswitch::configuration security nsapfiltering interfaces> ?
  delete          set             show
```

1.16.1.8.4.1 Deleting an NSAP Filter from an Interface

This command lets you delete an NSAP filter from an interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> delete <port> <vpi>
(incoming | outgoing)
```

1.16.1.8.4.2 Configuring an NSAP Filter on an Interface

This command lets you configure an NSAP filter on an interface. You can only configure one incoming and one outgoing filter per interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> set <port> <vpi>
<filter-id> (incoming | outgoing)
```

The parameters for delete and set are defined as follows:

Parameter	Description
port	The port number of the interface to which the filter applies.
vpi	The virtual path number of the interface to which the filter applies.
filter-id	The unique name or index number that identifies this filter.
incoming | outgoing[1]	**incoming** means that the filter applies to the incoming side of the interface. **outgoing** means that the filter applies to the outgoing side of the interface. If no incoming filter is specified for an interface, then all incoming calls are accepted on that interface. If no outgoing filter is specified for an interface, then all outgoing calls are accepted on that interface.

1. Calls to the switch itself (SNMP connections, telnet over ATM, etc.) can be filtered by setting an outgoing filter on the control port.

1.16.1.8.4.3 Displaying NSAP Filter Interface Information

This command lets you display all of the incoming and outgoing filters that have been configured on a specific interface. Enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> show
Port  VPI  Incoming Filter ID          Outgoing Filter Id
----  ---  ------------------          ------------------
1A1     0      21                          0
1A2     0     459 keep_them_out           94
1A3     0       0                          0
1A4     0       0                         36 filter_36
1D1     0       0                          0
1D2     0       0                          0
1D3     0       0                          0
1D4     0       0                          0
1CTL    0       0                         37 ctlport
```

The fields in this display are defined as follows:

Field	Description
Port	The port number of the interface to which the filter applies.
VPI	The virtual path number of the interface to which the filter applies.
Incoming Filter ID	The unique index number or name that identifies this incoming filter.
Outgoing Filter Id	The unique index number or name that identifies this outgoing filter.

You can also display the filters for a specific port and/or VPI; or the actual filters themselves, which shows all of the templates in each filter; or the actual templates themselves.

```
myswitch::configuration security nsapfiltering interfaces> show [<port> [<vpi>]]
[-filters] [-templates]
```

For example, to display the filters, enter the following parameters:

```
myswitch::configuration security nsapfiltering interfaces> show -filters
Port  VPI Direction Filter Name                Template IDs
----  --- --------- ------ ----                ------------
 1A1    0  Incoming     21                     10 12 40
 1A2    0  Incoming    459 keep_them_out       45 46 47 48
 1A2    0  Outgoing     94                     49 50
 1A4    0  Outgoing     36 filter_36           3984
1CTL    0  Outgoing     37 ctlport             625
```

1.17 SNMP Configuration Commands

These commands enable you to manage the SNMP communities and traps. You can display the list of available subcommands by typing **?** at the **snmp** level.

```
myswitch::configuration snmp> ?
  community        sets             show             trap>
```


1.17.1 Configuring the SNMP Community Access

This command lets you modify the SNMP community access to the switch. Enter the following parameters:

```
myswitch::configuration snmp> community (read | write) <community>
```

These parameters are defined as follows:

Parameter	Description
read | write	**read** indicates you want to set the community string for SNMP read operations (get and getnext requests). **write** indicates you want to set the community string for SNMP write operations (set requests).
community	The community string associated with **read** or with **write**. The default community string associated with **read** is **public**. The default community string associated with **write** is **private**.

1.17.2 Enabling or Disabling SNMP SETs

This command lets you enable or disable SNMP SET operations from the network. Enter the following parameters:

```
myswitch::configuration snmp> sets (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	SNMP set requests from remote management stations are accepted. This is the default. This variable can be set only by a user with **admin** privileges.
disable	SNMP set requests from remote management stations are ignored.

1.17.3 Displaying SNMP SET Information

This command shows you if SNMP SETs from the network are currently enabled or disabled. Enter the following parameters:

```
myswitch::configuration snmp> show
SET operations from network are enabled
```

1.17.4 Configuring SNMP Traps

These commands help you to manage SNMP traps. You can display the list of available subcommands by typing **?** at the **trap** level.

```
myswitch::configuration snmp trap> ?
  destinations>    log>
```

1.17.4.1 Configuring Trap Destinations

These commands help you to configure SNMP trap destinations. You can display the list of available subcommands by typing **?** at the **destinations** level.

```
myswitch::configuration snmp trap> destinations> ?
  delete           new              show
```

1.17.4.1.1 Deleting a Trap Destination

This command lets you delete an SNMP trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> delete <trap>
```

This parameter is defined as follows:

Parameter	Description
trap	Indicates the index number of the trap that you want to delete. Use the **conf snmp trap destinations show** command and look at the Trap field to find this number.

1.17.4.1.2 Creating a Trap Destination

This command lets you add an SNMP trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> new <ipaddress>
```

This parameter is defined as follows:

Parameter	Description
ipaddress	The IP address of the SNMP trap destination that you want to add.

1.17.4.1.3 Displaying Trap Destination Information

This command lets you display all of the existing SNMP trap destinations. Enter the following parameters:

```
myswitch::configuration snmp trap destinations> show
Trap    Destination
1       169.144.28.33
2       169.129.45.90
```

If no trap destinations have been configured, then the following is displayed:

```
myswitch::configuration snmp trap destinations> show
No trap information is available
```

1.17.4.2 Configuring the SNMP Trap Log

These commands let you configure the SNMP trap log. You can display the list of available subcommands by typing **?** at the **log** level.

```
myswitch::configuration snmp trap log> ?
  show             threshold>
```

1.17.4.2.1 Displaying the SNMP Trap Log

This command lets you display the log of the SNMP traps that occurred. Enter the following parameters:

```
myswitch::configuration snmp trap log> show
Index Trap                            Xmits LastXmit       Events LastEvent
                                         (time elapsed)       (time elapsed)
-------------------------------------------------------------------------------
1     trap_warmStart                  1     2 days 20:59   1      2 days 20:59
2     asxLinkDown                     1     2 days 20:59   1      2 days 20:59
3     asxSonetLOSDetected             1     2 days 20:59   1      2 days 20:59
4     asxLinkDown                     1     2 days 20:59   1      2 days 20:59
5     asxSonetLOFDetected             1     2 days 20:59   1      2 days 20:59
6     asxLinkDown                     1     2 days 20:59   1      2 days 20:59
7     asxDS3LOSDetected               1     2 days 20:59   1      2 days 20:59
8     asxLinkDown                     1     2 days 20:59   1      2 days 20:59
9     asxDS3LOSDetected               1     2 days 20:59   1      2 days 20:59
10    asxHostLinkUp                   1     2 days 20:59   1      2 days 20:59
11    asxSpansUp                      1     2 days 20:59   1      2 days 20:59
12    asxHostLinkUp                   1     2 days 20:59   1      2 days 20:59
13    asxSpansUp                      1     2 days 20:59   1      2 days 20:59
14    asxHostLinkUp                   1     2 days 20:59   1      2 days 20:59
15    asxSpansUp                      1     2 days 20:59   1      2 days 20:59
16    asxTempSensorRegularTemp        1     2 days 20:59   1      2 days 20:59
17    asxPsOutputUp                   1     2 days 20:59   1      2 days 20:59
18    asxPsInputUp                    1     2 days 20:59   1      2 days 20:59
19    asxSwitchLoginDetected          5     0 days 00:00   5      0 days 00:00
```

The fields in this display are defined as follows:

Field	Description
Index	Shows the index number of this trap.
Trap	Shows the name of this trap.
Xmits	Shows how many times this trap was transmitted to the trap destination.
LastXmit	Shows when this trap was last transmitted; i.e., how long ago it was transmitted.
Events	Shows how many times this trap actually occurred on the switch.
LastEvent	Shows how long ago this trap last occurred. (The first occurrence is always transmitted. After that, transmissions are determined by the threshold and time period.)

You can also display information about an individual trap as follows:

```
myswitch::configuration snmp trap log> show [<index>] [variables]
myswitch::configuration snmp trap log> show 11
Index Trap                          Xmits LastXmit       Events LastEvent
-------------------------------------------------------------------------------
11    asxSpansUp                    1     2 days 20:59   1      2 days 20:59
```

To display even more details about a trap occurrence, including the specific port number on which these traps occurred, use the **variables** option as follows:

```
myswitch::configuration snmp trap log> show variables
No Trap Variables for LogIndex: 1 Trap: trap_warmStart
LogIndex: 2 Trap: asxLinkDown
Variable                        Value
-----------------------------------------------------------------
hwPortName                      1B3
hwPortBoard                     0
hwPortModule                    1
hwPortNumber                    2
LogIndex: 3 Trap: asxSonetLOSDetected
Variable                        Value
-----------------------------------------------------------------
hwPortName                      1B3
hwPortBoard                     0
hwPortModule                    1
hwPortNumber                    2
LogIndex: 4 Trap: asxLinkDown
Variable                        Value
-----------------------------------------------------------------
Press return for more, q to quit: q
```


1.17.4.2.2 Configuring the Trap Log Threshold

These commands let you configure the SNMP trap log threshold. You can display the list of available subcommands by typing **?** at the **threshold** level.

```
myswitch::configuration snmp trap log threshold> ?
  modify          reset           show
```

1.17.4.2.2.1 Modifying the Trap Log Threshold

This command lets you specify the threshold and time period for sending traps to the trap destination or to a management station. The first occurrence of a trap is always transmitted. After that, if the number of occurrences of that trap exceeds the specified threshold, or if the time lag between two occurrences of that trap is greater than the specified time period, the latest trap gets transmitted out to the trap destination. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> modify <index> [-thresh <value>]
[-time <seconds>]
```

These parameters are defined as follows:

Parameter	Description
index	The index number of the trap whose threshold you want to modify.
-thresh <value>	If the number of occurrences of a given trap since the first occurrence of the trap exceeds this number, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent. The default is 1. The lowest acceptable value is 1. The upper limit is the size of an integer.
-time <seconds>	If the amount of time between two consecutive occurrences of a given trap exceeds this number, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent. The default is 1 second. The lowest acceptable value is 1 second. There is no upper limit.

1.17.4.2.2.2 Resetting the Trap Log Threshold

This command lets you reset the threshold and time period for sending traps to the trap destination or to a management station. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> reset
Reset all trap thresholds to defaults [n]? n
```

Entering **n** or pressing **<ENTER>** aborts the command. Entering **y** resets the threshold and time period.

1.17.4.2.2.3 Displaying the Trap Log Threshold

This command lets you display the threshold and time period for sending traps to the trap destination or to a management station. Enter the following parameters:

```
myswitch::configuration snmp trap log threshold> show
Index Trap                              Threshold     TimePeriod
-------------------------------------------------------------------------
1     asxSwLinkDown                     1             1
2     asxSwLinkUp                       1             1
3     asxHostLinkDown                   1             1
4     asxHostLinkUp                     1             1
5     asxNetModuleDown                  1             1
6     asxNetModuleUp                    1             1
7     asxPsInputDown                    1             1
8     asxPsInputUp                      1             1
9     asxPsOutputDown                   1             1
10    asxPsOutputUp                     1             1
11    asxFanBankDown                    1             1
12    asxFanBankUp                      1             1
Press return for more, q to quit: q
```


The fields in this display are defined as follows:

Field	Description
Index	The index number of the trap.
Trap	The name of the trap.
Threshold	If the number of occurrences of a given trap exceeds the threshold number shown, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent.
TimePeriod	If the amount of time between two consecutive occurrences of a given trap exceeds the time period number shown, then the latest trap is sent to the trap destination or management station. Otherwise, no trap is sent.

You can also display the threshold and time period for a specific trap as follows:

```
myswitch::configuration snmp trap log threshold> show [<index>]
myswitch::configuration snmp trap log threshold> show 10
Index Trap                              Threshold     TimePeriod
-------------------------------------------------------------------------
10    asxPsOutputUp                     1             1
```

1.18 SPANS Configuration Commands

These commands allow you to manage SPANS (Simple Protocol for ATM Network Signalling), FORE Systems' pre-standard signalling protocol. You can display the list of available subcommands by typing **?** at the **spans** level.

```
myswitch::configuration spans> ?
  delete           new              show
```

1.18.1 Deleting a SPANS Signalling Path

This command lets you delete an existing SPANS signalling path. Enter the following parameters:

```
myswitch::configuration spans> delete <port> <vpi>
```

ForeThought PNNI (FT-PNNI) uses the SPANS reserved signalling channel (VCI 15) for exchanging its routing information. In the previous releases of *ForeThought* software, when SPANS was deleted on a path, the SPANS signalling channel (VCI 15) was also deleted. This resulted in FT-PNNI routing going down. In *ForeThought* 5.0.x software, the SPANS signalling channel (VCI 15) is deleted on a path only when both SPANS and FT-PNNI are deleted on it.

Therefore, even if SPANS is deleted, as long as FT-PNNI is active, the SPANS signalling channel is kept alive by sending and receiving SPANS status messages on it. So, FT-PNNI could remain active even if SPANS is deleted. The SPANS module on the other side of the link is not aware of SPANS going down on the link (because it still keeps receiving status messages on it).

The SPANS topology will have only one unidirectional link from the switch on which SPANS is deleted to the switch on which SPANS is active. The other unidirectional link does not exist. Therefore, no one will be able to ping the switch on which SPANS is deleted.

1.18.2 Creating a SPANS Signalling Path

This command allows you to create a SPANS signalling path.

Before a SPANS signalling path can be created on a given VPI, an originating and a terminating path must exist for that same VPI.

Enter the following parameters:

```
myswitch::configuration spans> new <port> <vpi> [-cdvt <cdvt>] [(tag | drop)]
advanced options:
    [-sig <vci>] [-cls <vci>] [-aal (4 | 5 | auto)]
    [-sigbw <Kbps>] [-clsupc <index>]
    [-minvci <vci>] [-maxvci <vci>]
    [-opentimeout <msec>] [-closetimeout <msec>]
    [-outsigservice <vbr | ubr>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
port	The port number on which the SPANS signalling path exists.
vpi	The number of the SPANS path.
cdvt	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in micro-seconds.
tag | drop	**tag** means that non-compliant cells are tagged. **drop** means that non-compliant cells are dropped.
-sig <vci>	The VCI to use for SPANS signalling messages. The default is 15.
-cls <vci>	The VCI to use for connectionless messages. The default is 14.
-aal	The AAL type to use for this SPANS signalling path. Can be 4, 5, or auto. The default is 4.
sigbw	The amount of bandwidth, in Kbps, to be reserved on the VCI for SPANS signalling mes-sages.
-clsupc <index>	The integer index that refers to a specific traffic contract that is used to police the connec-tionless VCI. If no index is specified, no traffic policing will take place on this VCI. It is assigned a UPC index of 0, and all traffic on this VCI is treated as UBR traffic. This is the default.

Parameter	Description
-minvci <vci>	The bottom number for the range of VCIs to be reserved for SPANS SVCs on this path. The default is 32. You can change this range if you want to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs.
-maxvci <vci>	The top number for the range of VCIs to be reserved for SPANS SVCs on this path. The default is the maximum number of VCIs that the path supports. You can change this range if you want to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs.
-opentimeout	The timeout for SPANS open requests. This option should be used on links that have a high propagation delay, such as satellite links. The default is 300 msec.
-closetimeout	The timeout for SPANS close requests. This option should be used on links that have a high propagation delay, such as satellite links. The default is 500 msec.
-outsigservice	Configures the SPANS signalling channel to be put into either the UBR or VBR queue on the output side at the time the SPANS channel is created. By putting the SPANS signalling channel in the VBR queue, the SPANS signalling messages receive higher priority on the output side. This keeps UBR traffic from congesting the signalling traffic. The default is vbr.

The following is an example of how to configure SPANS to use only VCIs 32-100 on port 1A1, VPI 0:

```
configuration spans> new 1a1 0 -minvci 32 -maxvci 100
```

1.18.3 Showing the SPANS Signalling Path Configuration

This command lets you list an individual switch fabric's current SPANS signalling path information. Enter the following parameters:

```
myswitch::configuration spans> show
 Port  VPI  State Type   CDVT  Action RemoteAddress
 1A1     0  down  uni    1000  tag
 1A2     0  down  uni    1000  tag
 1A3     0  down  uni    1000  tag
 1A4     0  down  uni    1000  tag
 1A5     0  down  uni    1000  tag
 1A6     0  down  uni    1000  tag
 1C1     0  down  uni    1000  tag
 1C2     0  down  uni    1000  tag
 1C3     0  down  uni    1000  tag
 1C4     0  down  uni    1000  tag
 1CTL    0  down  uni       0  tag
```


The fields in this display are defined as follows:

Field	Description
Port	The port number of the SPANS signalling path.
VPI	The virtual path number of the SPANS signalling path.
State	The current state of the SPANS path. If the state is **up**, this path is operational. If the state is **down**, this interface is not operational.
Type	The type of connection on this SPANS path. If the type listed is **uni**, this is a SPANS user-to-network interface connection to a SPANS host. If the type listed is **nni**, then this is a SPANS network-to-network interface connection to another switch.
CDVT	The Cell Delay Variation Tolerance (CDVT), in microseconds.
Action	**Tag** means that non-compliant cells are tagged. **Drop** means that non-compliant cells are discarded.
Remote Address	The IP address of the remote endstation, if it is available.

To show advanced SPANS signalling path information about all of the ports, enter the following parameters:

```
myswitch::configuration spans> show advanced
 Port  VPI SigVCI CLSVCI AAL MinVCI MaxVCI SigBW CLSUPC OpenT/O CloseT/O OutServ
 1A1     0     15     14 4      32    511     0      0     300      500     vbr
 1A2     0     15     14 4      32    511     0      0     300      500     vbr
 1A3     0     15     14 4      32    511     0      0     300      500     vbr
 1A4     0     15     14 4      32    511     0      0     300      500     vbr
 1A5     0     15     14 4      32    511     0      0     300      500     vbr
 1A6     0     15     14 4      32    511     0      0     300      500     vbr
 1C1     0     15     14 4      32    511     0      0     300      500     vbr
 1C2     0     15     14 4      32    511     0      0     300      500     vbr
 1C3     0     15     14 4      32    511     0      0     300      500     vbr
 1C4     0     15     14 4      32    511     0      0     300      500     vbr
 1CTL    0     15     14 4      32   1023     0      0     300      500     vbr
```

The fields in this display are defined as follows:

Field	Description
Port	The port number of the SPANS signalling path.
VPI	The virtual path number of the SPANS signalling path.
SigVCI	The virtual channel number used for SPANS messages on the SPANS path.
CLSVCI	The VCI used for connectionless messages.
AAL	The AAL type used for SPANS messages.
MinVCI	The bottom number for the range of VCIs to be reserved for SPANS SVCs on this path.
MaxVCI	The top number for the range of VCIs to be reserved for SPANS SVCs on this path.
SigBW	The amount of bandwidth reserved on the VCI for SPANS signalling messages.
CLSUPC	The integer index that refers to a specific UPC contract used to police the connectionless VCI.
OpenT/O	The timeout, in msec, for SPANS open requests.
CloseT/O	The timeout, in msec, for SPANS close requests.
OutServ	The service queue in which the output SPANS VCC resides. Can be VBR or UBR. The default is **VBR**.

To list SPANS information for a specific port, (for example, port 1C1), enter the following parameters:

```
myswitch::configuration spans> show 1C1
 Port  VPI  State Type   CDVT  Action RemoteAddress
 1C1     0  down  uni    1000  tag
```

The fields in this display are defined in the same manner as those in the previous example.

To list SPANS information for a specific port and path, (for example, port 1C1 and VPI 0), enter the following parameters:

```
myswitch::configuration spans> show 1c1 0
 Port  VPI  State Type   CDVT  Action RemoteAddress
 1C1     0  down  uni    1000  tag
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced SPANS information for a specific port and path, (for example, port 1c3 and VPI 0), enter the following parameters:

```
myswitch::configuration spans> show 1b3 0 advanced
 Port  VPI SigVCI CLSVCI AAL MinVCI MaxVCI SigBW CLSUPC OpenT/O CloseT/O OutServ
 1C3     0     15     14 4       32    511     0      0     300      500     vbr
```

The fields in this display are defined in the same manner as those in the previous example.

1.19 SPVC Configuration Commands

These commands allow you to configure SPVCs (Smart Permanent Virtual Circuits). An SPVC is a connection that goes across multiple switch fabrics. An SPVC looks like a PVC at the local and remote endpoints with an SVC in the middle. SPVCs are more robust than PVCs. If a link carrying a PVC goes down, then the PVC goes down. If a link carrying an SPVC goes down and there is an alternate route, then the end switch fabrics of the SPVC automatically reroute the SPVC around the failed link. To display the list of available subcommands, type **spvc ?** at the **configuration** level.

```
myswitch::configuration> spvc ?
  spans>           pnni>
```

1.19.1 SPANS SPVC Configuration Commands

These commands allow you to configure SPANS SPVCs. To create a SPANS SPVC, you must configure the two ends concurrently on the two switch fabrics. Therefore, you must have an AMI session open on both the local switch fabric and the destination switch fabric. To display the list of available subcommands, type **spans ?** at the **spvc** level.

```
myswitch::configuration spvc> spans ?
  delete           new              show
```

1.19.1.1 Deleting a SPANS SPVC

This command allows you to delete an existing SPANS SPVC. There are two different ways to delete an SPVC. Enter the following parameters:

myswitch::conf spvc spans> **delete** *<Local SPVC ID>* [(**source** | **destination** | **bidirectional**)]
or
myswitch::configuration spvc spans> **delete** *<port> <vpi> <vci>*\
<dest-session> <dest-port> <dest-vpi> <dest-vci>\ [(**source** | **destination** | **bidirectional**)]

1.19.1.2 Creating a SPANS SPVC

This command allows you to create a new SPANS SPVC. Enter the following parameters:

myswitch::configuration spvc spans> **new** *<port> <vpi> <vci> <dest-session> <dest-port> <dest-vpi> <dest-vci>*\
[**-peak** *<Kb/sec>*] [(**source** | **destination** | **bidirectional**)]

The parameters for delete and new are defined as follows:

Parameter	Description
Local SPVC ID	Used only with the **delete** command. The unique number that the SCP assigned to this SPANS SPVC when it was created.
port	The port number on the local switch fabric.
vpi	The virtual path number on the local switch fabric.
vci	The virtual channel number on the local switch fabric.
dest-session	The IP address of the remote switch.
dest-port	The port number on the remote switch fabric.
dest-vpi	The virtual path number on the remote switch fabric.
dest-vci	The virtual channel number on the remote switch fabric.
-peak <Kb/sec>	The amount of peak bandwidth allocated for this SPANS SPVC, specified in kilobits per second. The default is **0**.
source | destination | bidirectional	**source** means a unidirectional SPANS SPVC going from the local switch fabric to the remote switch fabric will be created. **destination** means a unidirectional SPANS SPVC going from the remote switch fabric to the local switch fabric will be created. **bidirectional** means the pair of unidirectional SPANS SPVCs will be created. The default direction, if you do not specify one, is **bidirectional**.

To create a bidirectional SPANS SPVC, you must either specify bidirectional, or you must set up two unidirectional SPANS SPVCs with one going in each direction.

To create a SPANS SPVC, you need to configure the two ends concurrently on the two switch fabrics. Therefore, you first need to open an AMI session to the destination switch fabric by using the SCP's IP address, along with the SNMP read-write community string. The following example depicts how to create a bidirectional SPVC from the local switch fabric (myswitch) to a remote switch fabric (198.29.22.46 named fishtank). The asterisk (*) in front of the prompt indicates that it is a remote session. To return to the local session, you must type **localhost** (instead of the prompt name).

```
myswitch::> open 198.29.22.46 private

Opening a session for "198.29.22.46", please wait...
Connected to "198.29.22.46" (asx200bxtnx-210).
*fishtank::> localhost

myswitch::> configuration spvc spans new ?

usage: new <port> <vpi> <vci> <dest-session> <dest-port> <dest-vpi>
<dest-vci> \[-peak <Kb/sec>] [(source | destination | bidirectional)]

myswitch::configuration spvc spans> new 1c1 0 49 198.29.22.46 1b1 0 50
```

1.19.1.3 Displaying SPANS SPVC Information

This command allows you to display all of the SPANS SPVCs on an individual switch fabric. Enter the following parameters:

```
myswitch::configuration spvc spans> show
Local                                    Remote
ID    Port VPI VCI     BW Direction      ID    Port VPI VCI Switch
35664 1C1    0  51    0.0 bidirectional  10427 1B1    0  52 198.29.22.46
65364 1C1    0  49    0.0 bidirectional  42591 1B1    0  50 198.29.22.46
```


The fields in this display are defined as follows:

Field	Description
Local ID	The unique number that the local switch fabric's SCP assigned to this SPANS SPVC when it was created.
Local Port	The port number on the local switch fabric.
Local VPI	The virtual path number on the local switch fabric.
Local VCI	The virtual channel number on the local switch fabric.
Local BW	The amount of peak bandwidth allocated for this SPANS SPVC, specified in Kbps.
Remote ID	The unique number that the remote switch fabric's SCP assigned to this SPANS SPVC when it was created.
Remote Port	The port number on the remote switch fabric.
Remote VPI	The virtual path number on the remote switch fabric.
Remote VCI	The virtual channel number on the remote switch fabric.
Switch	The IP address or name of the remote switch fabric's SCP.

The following is displayed if no SPANS SPVCS have been configured:

```
myswitch::configuration spvc spans> show
No SPVC information is available
```

1.19.2 PNNI SPVC Configuration Commands

These commands allow you to configure PNNI SPVCs. Unlike the SPANS SPVCs, PNNI SPVCs are inherently bidirectional, which means that a single signalling call establishes the circuits in both directions. Although PNNI SPVCs are bidirectional, the endpoint that initiates the call setup is known as the source (originating) and the other endpoint is known as the destination (terminating). You can display the list of available subcommands by typing **pnni ?** at the **spvc** level.

```
myswitch::configuration spvc> pnni ?
  delete           new              parameters>      show
```

1.19.2.1 Deleting a PNNI SPVC

This command allows you to delete an existing PNNI SPVC from the source end. Enter the following parameters:

```
myswitch::configuration spvc pnni> delete <SPVC ID>
```

The following is an example of how to delete a PNNI SPVC:

```
myswitch::configuration spvc pnni> delete 3428
```

If you enter an SPVC ID that does not exist, the following error message is returned:

```
myswitch::configuration spvc pnni> delete 16451

?ERROR: SNMP: the specified value is invalid
```

1.19.2.2 Creating a PNNI SPVC

This command lets you create a PNNI SPVC. Enter the following parameters:

You do not need to open a session to the destination switch to create a PNNI SPVC because all PNNI SPVCs are bidirectional.

```
myswitch::configurat spvc pnni> new <port> <vpi> <vci> <destnsap | destprefix:destport>\
        [-spvcid <index>] \
        [-domainid <id>] \
        [-name <name>] [-destvpi <vpi> -destvci <vci>] \
        [-reroute (enable|disable)] \
        [-fupc <index>] [-bupc <index>]
advanced options:
        [-ftpnniDtl <index>] [-bearerClass (X | A | C)] \
        [-clip <no|yes>] \
        [-QoSExpIndex <index>]\
        [-fqos (class0 | class1 | class2 | class3 | class4)] \
        [-bqos (class0 | class1 | class2 | class3 | class4)]
Note: <destprefix:destport> option can be used only if the destination
switch is a FORE switch.
```

The parameters for delete and new are defined as follows:

Parameter	Description
SPVC ID or -spvcid <index>	The index number assigned to this SPVC to identify it uniquely. For PNNI SPVCs, the index number may be assigned either by AMI or by the user. Valid values are integers between 1 and 65535.
port	The port number on the source (local) switch fabric.
vpi	The virtual path number on the source (local) switch fabric.
vci	The virtual channel number on the source (local) switch fabric.
destnsap	The ATM NSAP address of the destination (remote) switch for this SPVC.
destprefix:destport	The ATM NSAP prefix and the port number of this terminating SPVC at the destination end. This option is valid only if the destination switch is a FORE switch.
-domainid <id>	The PNNI domain ID number on the source (local) switch fabric.
-name <name>	An optional name for the user to assign to this PNNI SPVC to help uniquely identify it.
-destvpi <vpi>	The virtual path number on the destination switch fabric for this PNNI SPVC. When using this option, both the **destvpi** and **destvci** must be specified.

Parameter	Description
-destvci <vci>	The virtual channel number on the destination switch fabric for this PNNI SPVC. When using this option, both the **destvpi** and **destvci** must be specified.
-reroute (enable | disable)	**enable** indicates that this SPVC will be examined periodically to see if it is using a sub-optimal route. If it is, it will be rerouted according to the parameters in **conf spvc pnni parameters reroute**. **disable** indicates that this SPVC will not be examined periodically to see if it is using a sub-optimal route. The default state for PNNI SPVCs is **disabled**. If you want to change this value for this PNNI SPVC after you create it, you must delete it and then recreate it.
-fupc <index>[1]	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the **conf upc show** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-bupc <index>	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index assigned to this SPVC. To find the index you want, use the **conf upc show** command. If no index is specified, the default index of `0` (UBR best effort) is used.
-ftpnniDtl <index>[2]	The Designated Transit List (DTL) index assigned to this SPVC. The DTL specifies the preferred call routing for the SVC portion of the SPVC. To find the index you want, use the **conf atmroute ftpnni dtl show** command.
-bearerClass (X | A | C)	The requested broadband bearer class for this SPVC. **X** is for all types of ATM media. **A** is for non-ATM CBR media. **C** is for non-ATM VBR, UBR, and ABR media. The default is **X**.
-clip <no | yes>	During speech transmission, clipping is the loss of a brief interval at the beginning of a speech spurt. **no** indicates this SPVC is not susceptible to clipping. **yes** indicates this SPVC is susceptible to clipping. The default is **no**.
-QoSExpIndex <index>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVC call set-up message across a PNNI link. See the `QoSExpIndex` field under **conf qos show** for this number. The qosindex that is specified for this SPVC must already be present in the switch.
-fqos (class0 | class1 | class2 | class3 | class4)	The requested QoS class for this SPVC in the forward (calling to called) direction. The `-fqos` and `-bqos` options must be either both class0 or both a non-zero class.
-bqos (class0 | class1 | class2 | class3 | class4)	The requested QoS class for this SPVC in the backward (called to calling) direction. The `-fqos` and `-bqos` options must be either both class0 or both a non-zero class.

1. The forward and backward UPC contracts that you specify must be compatible with the `bearerClass` parameter for the SPVC (e.g., all parameters are for VBR traffic or CBR traffic).

2. If you configure an SPVC to use a specific FT-PNNI DTL that you have created, the SVC portion of the SPVC always uses that path as long as it is available, even if there is another path that has a lesser link cost.

The following is an example of how to create a simple PNNI SPVC:

```
myswitch::configuration spvc pnni> new 1a1 0 100 47.0005.80.ffe100.0000.f21b.19cd:1b1
```

If you configure a PNNI SPVC on a Circuit Emulation Services (CES) connection, you must set the following appropriate values for the options under **`conf spvc pnni new`**. For **`[-bearerClass (X|A|C)]`**, use **`X`**. For **`[-clip (no|yes)]`**, use **`no`**.

When creating an SPVC, the `-fqos` and `-bqos` options must be either both `class0` or both a non-zero class. For example, the `-fqos` cannot be `class0` and the `-bqos` be `class1`. This combination is invalid. Having an `-fqos` of `class0` and a `-bqos` of `class0` is a valid combination, and having an `-fqos` of `class1` and a `-bqos` of `class4` is a valid combination, but having an `-fqos` of `class2` and a `-bqos` of `class0` is not valid.

1.19.2.3 Configuring PNNI SPVC Parameters

The pacing parameters under **conf spvc pnni parameters pacing** regulate the call setup cycle for SPVCs that are "down" (established, but currently not active). The pacing cycle is as follows:

1. For all SPVCs in the down state, attempt the *<number>* of SPVC call setups.
2. Pause for *<interval>* seconds between attempts.
3. If unsuccessful, go to step 1.

Rerouting parameters regulate whether or not to evaluate periodically the efficiency of the routes used by the PNNI SPVCs that are up (established and currently active). If enabled, the rerouting cycle is as follows:

1. Check the current call routing cost for all PNNI SPVCs that are up. (The call routing cost is the sum of all the link costs over the call route (for *ForeThought* PNNI) or the sum of the administrative weight over the call route (for PNNI). The current cost for a particular SPVC can be displayed using **conf spvc pnni show advanced**.)
2. Check to see if better (new call routing cost is less by *<threshold>* percentage) routes are available. If not, go to step 3. If so, release the SPVC and reroute (attempting to reconnect using the pacing cycle) those that can be improved and then go to step 3.
3. Pause for *<interval>* seconds.
4. Go to step 1.

Type **parameters ?** at the **pnni** level to display the available subcommands.

```
myswitch::configuration spvc pnni> parameters ?
  pacing>          reroute>
```

1.19.2.3.1 Configuring Pacing for PNNI SPVCs

If a switch has a large number of SPVCs configured in the CDB, it tries to open the SPVCs all at once when it reboots. Therefore, it is advantageous to pace the number of SPVCs that are opened at once, so that each is serviced properly. This command lets you set the SPVC controller to open only the configured number of SPVCs and to schedule itself for callback after the specified time interval if there are more SPVCs to be opened, both at start up and at the retry callback. To display the available subcommands, type **?** at the **pacing** level.

```
myswitch::configuration spvc pnni parameters pacing> ?
  interval         number           show
```

1.19.2.3.1.1 Setting the PNNI SPVC Pacing Interval

This command allows you to change the interval between call setup attempts for SPVCs that are down. Enter the following parameters:

```
myswitch::configuration spvc pnni parameters pacing> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds>	The interval, in seconds, between call setup attempts. Values can be from **1** to **300** seconds. The default is **2** seconds.

1.19.2.3.1.2 Setting the Number of PNNI SPVC Calls

This command lets you configure the number of SPVCs that can be set up at one time during an attempt. Enter the following parameters:

```
myswitch::configuration spvc pnni parameters pacing> number <count>
```

This parameter is defined as follows:

Parameter	Description
number <count>	The number of SPVCs which can be set up at one time during an attempt. Values can be from **1** to **1000**. The default is **20** calls.

1.19.2.3.1.3 Displaying the PNNI SPVC Pacing Parameters

This command lets you display the parameters that have been set for attempting call setups between down PNNI SPVCs. Enter the following parameters:

```
myswitch::configuration spvc pnni parameters pacing> show
Pacing will setup 20 calls per cycle with 2 seconds between cycles.
```

1.19.2.3.2 Configuring Rerouting for PNNI SPVCs

Sometimes SPVCs are forced to use a less than optimal route because of temporary link failures or because of an inconsistent routing database. This command lets you configure the SPVC controller to check for SPVCs that are using less than optimal routes and reroute them if a better route becomes available. For PNNI, a path is considered "better" than another path if its administrative weight is lower by a specified percentage. For *ForeThought* PNNI, a path is considered "better" than another path if it has a lower link cost. You can display the list of available subcommands by typing **?** at the **reroute** level.

```
myswitch::configuration spvc pnni parameters reroute> ?
  interval         number           show             threshold
```

1.19.2.3.2.1 Setting the Interval between the Rerouting of PNNI SPVCs

This command lets you indicate the number of seconds between callbacks to the SPVC controller to reroute PNNI SPVCs. Enter the following parameters:

```
myswitch::configuration spvc pnni parameters reroute> interval <seconds>
```

This parameter is defined as follows:

Parameter	Description
interval <seconds>	The time interval, in seconds, between successive callbacks to the SPVC controller to check for and reroute existing SPVC connections if a better path becomes available. The default is **10** seconds. The range of valid values is **1** to **3600**, inclusive.

1.19.2.3.2.2 Setting the Number of PNNI SPVCs to be Rerouted per Interval

At each interval between reroutes, you can check a certain number of the active SPVCs to see if they are using optimal routes. This command lets you determine the number of SPVCs that are analyzed at each interval.

```
myswitch::configuration spvc pnni parameters reroute> number <count>
```

This parameter is defined as follows:

Parameter	Description
number <count>	Indicates how many up SPVCs, per interval, will be analyzed to determine whether or not those SPVCs need to be rerouted. The default is **20** SPVCs. The range of valid values is **1** to **1000**, inclusive.

1.19.2.3.2.3 Displaying PNNI SPVC Reroute Information

This command lets you display information about PNNI SPVC rerouting. Enter the following parameters:

```
myswitch::configuration spvc pnni parameters reroute> show

Rerouting analyzes 20 calls per cycle with 10 seconds between cycles.

The new call routing cost must show a 50 percent improvement over
the current call routing cost before the call is rerouted.
```

1.19.2.3.2.4 Setting the Improvement Threshold for Rerouting

This command lets you configure the routing cost improvement percentage against which the SPVCs are analyzed to see if there is a better route available. Enter the following parameters:

```
myswitch::configuration spvc pnni parameters reroute> threshold <percent>
```

This parameter is defined as follows:

Parameter	Description
threshold <percent>	The minimum percentage improvement in the cost that the new SPVC path must have over the current SPVC path before a reroute is performed. The default value is **50** percent. The range of valid values is **1** to **99**, inclusive.

1.19.2.4 Displaying PNNI SPVC Information

This command allows you to display all of the PNNI SPVCs that originate and terminate on an individual switch fabric. By entering **show ?**, you can list the various ways of displaying PNNI SPVC information as follows:

```
myswitch::configuration spvc pnni> show ?
usage: show [<spvcid>] [(orig | term)] [(advanced)]
```

These parameters are defined as follows:

Parameter	Description
show	By entering **show** with no arguments, basic information is displayed for all originating and terminating PNNI SPVCs associated with this switch.
spvcid	By entering **show** with a specific *<spvcid>*, lists basic information for only that PNNI SPVC.
orig	By entering **show** with **orig**, basic information is displayed for all originating PNNI SPVCs associated with this switch.
term	By entering **show** with **term**, basic information is displayed for all terminating PNNI SPVCs associated with this switch.
advanced	By entering **show** with **advanced**, both basic and advanced information is displayed for the PNNI SPVCs specified in the option.

For example, to display basic information about all PNNI SPVCs on this switch, enter the following parameters:

```
myswitch::configuration spvc pnni> show
Originating PNNI SPVCs:
       Source              Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL   STATE
 402   1B4  0    402  0   3A1  0    402  0   require    down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
Terminating PNNI SPVCs:
       Source         Destination
 INDEX PORT VPI  VCI  PORT VPI  VCI  STATE
 2     4B2  0    401  1D3  0    401  up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
```

The fields in this display are defined as follows:

Field	Description
Source INDEX	The index number assigned to this PNNI SPVC by AMI to identify it uniquely from other PNNI SPVCs that have this switch fabric as their source.
Source PORT	The port number on the local switch fabric for this PNNI SPVC.
Source VPI	The virtual path number on the local switch fabric for this PNNI SPVC. **any** means that the user did not specify the VPI to be used at the destination.
Source VCI	The virtual channel number on the local switch fabric for this PNNI SPVC. **any** means that the user did not specify the VCI to be used at the destination.
Source UPC	The forward (going from the local switch fabric to the remote switch fabric) UPC contract index associated with this PNNI SPVC.
Source	The NSAP ATM address for the originating side of the PNNI SPVC.
Destination PORT	The port number of this terminating PNNI SPVC at the destination end if the destination end is a FORE switch. If the port at the destination switch cannot be determined, a question mark (?) is displayed.
Destination VPI	The virtual path number on the destination switch fabric for this PNNI SPVC.
Destination VCI	The virtual channel number on the destination switch fabric for this PNNI SPVC.
Destination UPC	The backward (going from the remote switch fabric to the local switch fabric) UPC contract index associated with this PNNI SPVC.
Destination VPVC-SEL	**NoPref** means that you did not specify which VPI/VCI combination that the destination switch should use when this PNNI SPVC was created. If the destination switch is a FORE switch, the values are displayed in the Destination VPI and Destination VCI fields. If the destination switch is not a FORE switch, a ? is displayed in the Destination VPI and Destination VCI fields. Require means that the destination switch must use the VPI/VCI combination given when the PNNI SPVC was created.
Destination STATE	The state of this SPVC. Can be **up** or **down**.
Destination	The NSAP ATM address for the terminating side of the PNNI SPVC.

To display advanced and basic information about all PNNI SPVCs on this switch, enter the following parameters:

```
myswitch::configuration spvc pnni> show advanced
Originating PNNI SPVCs:
       Source              Destination
 INDEX PORT VPI  VCI  UPC PORT VPI  VCI  UPC VPVC-SEL   STATE
 402   1B4  0    402  0   3A1  0    402  0   require    down
       Destination: 0x47.0005.80.ffe100.0000.f21c.28c8.0020480d0072.00
 BearerClass=classX,ForwardQos=class0,BackwardQos=class0,Clip=no
 Cost = 200, Reroute = disabled, FtpnniDtl = none, Name = N/A
 Domainid = 1, QoSExpIndex = 0
 Last Failure Cause = resource-unavailable-or-unspecified-Cause47
 Downtime = 0 days 05:46, Retry Count = 1851
Terminating PNNI SPVCs:
       Source         Destination
 INDEX PORT VPI  VCI  PORT VPI  VCI  STATE
 2     4B2  0    401  1D3  0    401  up
       Source: 0x47.0005.80.ffe100.0000.f21c.28d8.0020480d00b4.00
 BearerClass=classX,ForwardQos=class0,BackwardQos=class0,Clip=no
 Uptime = 0 days 05:46
```

The basic information fields in this display are defined as listed previously for **configuration spvc pnni show**. The advanced information fields in this display are defined as follows:

Field	Description
BearerClass	The broadband bearer class specified for this PNNI SPVC. Can be **classA**, **classC**, or **classX**.
ForwardQos	The requested quality of service for this SPVC in the forward (calling to called) direction.
BackwardQos	The requested quality of service for this SPVC in the forward (called to calling) direction.
Clip	**no** means this PNNI SPVC is not susceptible to clipping an **yes** means it is susceptible to clipping.
Cost	The current call routing cost for this originating PNNI SPVC. If the SPVC is down, shows **N/A**.
Reroute	**Enable** means this SPVC will be examined to see if it is using a sub-optimal route. If it is, it is rerouted according to the parameters in **conf spvc pnni parameters reroute**. **Disable** means this SPVC will not be examined to see if it is using a sub-optimal route.
FtpnniDtl	The Designated Transit List (DTL) index assigned to this SPVC. The DTL specifies the preferred call routing for the SVC portion of the SPVC. An asterisk (*) before the DTL index means the SVC is not currently being routed according to the specified DTL because the route in the DTL has failed or because the switch cannot locate the route.

Field	Description
Name	The optional name assigned to this PNNI SPVC to help identify it. If no name is assigned, **N/A** is displayed.
Domainid	The PNNI domain ID number on the source (local) switch fabric.
QoSExpIndex	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when sending the SPVC call set-up message across a PNNI link. See the QoSExpIndex field under **conf qos show** for this number.
Last Failure Cause	The reason for the last call setup failure for this PNNI SPVC. This field is only displayed for originating SPVCs that are down.
Uptime	If applicable, shows, in hundredths of a second, the time since this PNNI SPVC was created or the time since the last successful call setup occurred. The STATE shows **up**.
Downtime	If applicable, shows, in hundredths of a second, the time that this PNNI SPVC has been down. The STATE shows **down**.
Retry Count	Displays the number of times the call setup has been attempted since the PNNI SPVC was created or since the last successful call setup occurred. This is only displayed when the STATE is **down**.

If no PNNI SPVCs have been configured, you receive the following message:

```
myswitch::configuration spvc pnni> show
Originating PNNI SPVCs:
 No originating PNNI SPVC information is available
Terminating PNNI SPVCs:
 No terminating PNNI SPVC information is available
```

1.20 Switch Configuration Commands

These commands allow you to configure default settings for the switch. You can display the list of available subcommands by typing **switch ?** at the **configuration** level.

```
myswitch::configuration> switch ?
  callrecord>        pools>             name               pmpmaxvci
  pmpminvci          show               timezone
```

1.20.1 Configuring Call Records and Performance Monitoring

These commands let the user configure call records and performance monitoring used for billing purposes. You can display the list of available subcommands by typing **callrecord ?** at the **switch** level.

```
myswitch::configuration switch> callrecord ?
  new              modify           enable           disable
  delete           password         show
```

1.20.1.1 Creating Call Record and Performance Monitoring Variables

This command lets you configure new call record or performance monitoring transfer variables. Enter the following parameters:

```
myswitch::conf switch callrecord> new (cr|perf) <primary-URL> <secondary-URL> <userid>\
       [-interval <recording-interval-in-minutes>]
Note: <primary-URL> and <secondary-URL> are of the form
      //<ip-address>[:port][<pathname>[<filename>]]
```

The following is an example of how to set up the variables for a call record transfer:

```
myswitch::conf switch callrecord> new cr //169.14.149.90/us/bob/info/cr/switcha/ //
169.14.0.90/us/bob/info/cr/switcha/ bob -interval 1
```

1.20.1.2 Modifying Call Record and Performance Monitoring Variables

This command lets you modify the call record or performance monitoring transfer variables. Enter the following parameters:

```
myswitch::conf switch callrecord> modify (cr|perf) [-primary <primary-URL>]\
        [-secondary <secondary-URL>] \
        [-userid <userid>] [-interval <recording-interval-in-minutes>]
Advanced options for cr:
        [-memory <percentage>] [-action <rejectCall|noRecord>]
Note: <primary-URL> and <secondary-URL> are of the form
      //<ip-address>[:port][<pathname>[<filename>]]
```

The following is an example of how to modify the variables for a call record transfer:

```
myswitch::configuration switch callrecord> modify cr -action noRecord
```

These parameters for new and modify are defined as follows:

Parameter	Description
cr	Indicates a call record transfer variable.
perf	Indicates a performance monitoring transfer variable.
primary-URL	The primary URL for call record transfers in the form: `//<ip-address>[:port][<pathname>[<filename>]]` If the `Admin status` is `on` and this URL is changed, the change takes effect at the next recording interval.
ip-address	The IP address of the host to contact.
port	The port on the host to contact.
pathname	The directory on the host into which the data should be put.
filename	The filename on the host into which the data should be put.
The pathname and filename are each strings of characters consisting of the following special tokens:	
%T	The type of switch.
%N	The “SerialNumber” for an ASX-200BX or TNX-210, or the “EnclosureNumber.Serial-Number” for an ASX-1000 or TNX-1100.
%I	The switch’s IP address (e.g., 169.144.1.90).
%D	The date and time formatted as follows: YYYYMMDDhhmm.
%R	The interval between recordings, in minutes.

Parameter	Description
%C	The contents of the call record file; **account** is for call record data and **stats** is for performance monitoring data.
%F	The status of the file; **co** is for the file to which the switch fabric is currently writing, cc is for the file to which the switch fabric has completed writing. If the pathname is not specified, the default file is transferred to the login directory specified in *<userid>*. The following string is used as the default filename in the case where the URL ends with a "/" (i.e., without any filename): %T_%C.%D.%R.%N.%F If multiple switches are to write to the same location, the pathname or filename should contain either a %I or a %N token. A %D token in the filename portion separates each recording interval worth of data into a different file with the name being the time that the file was created. The following example would record every switch type and switch IP into a separate directory with a file at each recording interval: **//169.144.1.5/usr/auditlog/%T/%I/%D** Given an ASX-200BXTNX-210 switch with an IP address of 169.44.4.4, this would produce files in the following directory tree structure: **/usr/auditlog/ASX200BXTNX1100/169.44.4.4/9608252355** If the filename specified is not made up of the above tokens, then it is used as a prefix to the default filename. If the file transfer attempt fails, the switch generates a trap and attempts a transfer to the secondary-URL. If the Admin status is secondary-URL and this URL is changed, the change takes effect at the next recording interval.
secondary-URL	The URL is to be used in the event that the transfer to the primary URL is not successful. If the file transfer attempt to this URL fails as well, the switch generates a trap. If the Admin status is on and this URL is changed, the change takes effect at the next recording interval.
userid	The userid to be used for the data transfer sessions to the primary and secondary data servers. If the Admin status is on and this URL is changed, the change takes effect at the next recording interval.
recording-interval-in-minutes	The interval (in minutes) at which the data is transferred to the host. If the Admin status is on and this value is changed, the change takes effect at the next recording interval. Valid values are integers greater than or equal to 1. The default is 5 minutes.
memory	Specifies what portion of the processor DRAM is to be reserved for call records. Changing this value affects the amount of memory available for signalling and routing, and may result in increased call blocking. A change in this value takes effect only after the next call record initialization (i.e., when the Admin status changes from off to on or when the switch (fabric) is rebooted). Valid values are from 1 - 50%. The default is 15%.
action	The action that the switch (fabric) should take if the memory allocated for call records runs out. **rejectCall** means that the call should be rejected. **noRecord** means that the call should be allowed, but no call record should be generated for that call. If this value is changed, it takes effect immediately. The default is **rejectCall**.

1.20.1.3 Enabling Call Record and Performance Monitoring Transfers

This command allows you to enable (turn on) call recording or performance monitoring transfers for the switch (fabric). Enter the following parameters:

```
myswitch::configuration switch callrecord> enable perf
or   cr [-memory <percentage>] [-action <rejectCall|noRecord>]
```

The following is an example of how to enable a call record transfer:

```
myswitch::configuration switch callrecord> enable cr -memory 20 -action noRecord
```

1.20.1.4 Disabling Call Record and Performance Monitoring Transfers

This command allows you to disable (turn off) call recording or performance monitoring transfers for the switch (fabric). Enter the following parameters:

```
myswitch::configuration switch callrecord> disable (cr|perf)
```

The following is an example of how to disable a call record transfer:

```
myswitch::configuration switch callrecord> disable cr
Are you sure you want to disable Callrecords [n]? y
Callrecords disabled
```

These parameters for enable and disable are defined as follows:

Parameter	Description
perf	The performance monitoring functionality is to be enabled[1] / disabled[2].
cr	The call recording functionality is to be enabled / disabled.
memory	Specifies what portion of the processor DRAM is to be reserved for call records. Changing this value affects the amount of memory available for signalling and routing, and may result in increased call blocking. A change in this value takes effect only after the next call record initialization (i.e., when the `Admin status` changes from `off` to `on` or when the switch (fabric) is rebooted). Valid values are from 1 - 50%. The default is 15%.
action	The action that the switch (fabric) should take if the memory allocated for call records runs out. **`rejectCall`** means that the call is rejected. **`noRecord`** means that the call is allowed, but no call record is generated for that call. If this value is changed, it takes effect immediately. The default is **`rejectCall`**.

1. Ensure that the switch time and date are set correctly using **`oper date`** before enabling the call recording feature using **`conf switch callrecord enable cr`**. Otherwise, your call records will not be accurate.

2. Disabling call records or performance monitoring means that this information will not be recorded or transferred. However, the configuration information for the transfer variables (i.e., the primary URL, secondary URL, recording interval) will still be present.

1.20.1.5 Deleting Call Record and Performance Monitoring Transfer Variables

This command allows you to delete call record transfer variables or performance monitoring transfer variables. Enter the following parameters:

```
myswitch::configuration switch callrecord> delete (cr|perf)
```

These parameters are defined as follows:

Parameter	Description
perf	The performance monitoring feature is to be deleted.
cr	The call record feature is to be deleted.

The following is an example of how to delete call record transfer variables:

```
Are you sure you want to disable and delete Callrecords configuration [n]? y
Callrecords configuration deleted.
myswitch::configuration switch callrecord> show
Callrecords has not been configured.
```

1.20.1.6 Setting the Data Server Password

This command allows you to change the data server password for call records or for performance monitoring. Enter the following parameters:

```
myswitch::configuration switch callrecord> password (cr|perf)
```

These parameters for enable and disable are defined as follows:

Parameter	Description
password	The password[1] to be used for the data transfer sessions to the primary and secondary data servers.[2]
perf	The password is being set for performance monitoring.
cr	The password is being set for call recording.

1. If the `Admin status` is on and the password is changed, the change takes effect at the next recording interval.
2. For security reasons, the switch will not echo your password, but will ask you to confirm the password by retyping it.

```
myswitch::configuration switch callrecord> password cr
Enter password:
Retype new password:
```

1.20.1.7 Displaying Call Record and Performance Monitoring Information

This command allows you to display call records or performance monitoring information for the entire switch fabric. Enter the following parameters:

```
myswitch::configuration switch callrecord> show (cr|perf)[advanced]
myswitch::configuration switch callrecord> show cr
   Admin status                      = on
   Primary URL                       = //169.14.149.90/us/bob/info/cr/switcha/
   Secondary URL                     = //169.14.0.90/us/bob/info/cr/switcha/
   Recording interval                = 1
   Data server userid                = bob
```

To display advanced information, enter the following parameters:

```
myswitch::configuration switch callrecord> show cr advanced
   Admin status                      = on
   Primary URL                       = //169.14.149.90/us/bob/info/cr/switcha/
   Secondary URL                     = //169.14.0.90/us/bob/info/cr/switcha/
   Recording interval                = 1
   Data server userid                = bob
   Memory allocated                  = 20 percent
   Memory overflow action            = dontRecordCall
   Failed primary data transfers     = 0
   Failed secondary data transfers   = 0
   File transfer status              = 0
   File transfer error message       =
   Primary trap status               = crXfrNoError
   Secondary trap status             = crXfrNoError
```

The fields in these displays are defined as follows:

Field	Description
Admin status	Shows if call recording is **on** (enabled) or **off** (disabled). The default is **off**.
Primary URL	The primary URL for call record or performance monitoring transfers.
Secondary URL	The URL is to be used in the event that the transfer to the primary URL is not successful.
Recording interval	The interval at which the the relevant information is transferred to the host. The default is 5 minutes.
Data server userid	The userid to be used for the data transfer sessions to the primary and secondary data servers.
Memory allocated	Specifies what portion of the processor DRAM is to be reserved for call records. The default is 15%. Valid values are from 1 - 50%.

Field	Description
Memory overflow action	The action that the switch (fabric) takes if the memory allocated for call records runs out. **`rejectCall`** means that the call is rejected. **`noRecord`** means that the call is allowed, but no call record is generated for that call. The default is **`rejectCall`**.
Failed primary data transfers	The number of failed data transfers to the primary data server.
Failed secondary data transfers	The number of failed data transfers to the secondary data server.
File transfer status	One of the following messages describing the status of the current file transfer: `primaryInProgress`, `secondaryInProgress`, `primarySucceeded`, `secondarySucceeded`, `bothFailed`. If the data transfer is not successful, refer to the message in the `Primary trap status` or `Secondary trap status` field.
File transfer error message	A text message describing the status of the last failed file transfer.
Primary trap status	The trap status of the file transfer to the primary URL. The trap status is `crXfrNoError` at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the following error conditions: `crXfrNoResponseFromServer`, `crXfrAccessViolation`, `crXfrDiskFullorAllocationExceeded`, `crXfrOtherError`.
Secondary trap status	The trap status of the file transfer to the secondary URL. The trap status is `crXfrNoError` at the start of the data transfer process. If an error condition occurs, a trap is generated and this field is updated to reflect one of the error conditions listed above.

If call records have not been configured, you receive the following message:

```
myswitch::configuration switch callrecord> show cr
Callrecords not configured.
```

If performance monitoring has not been configured, you receive the following message:

```
myswitch::configuration switch callrecord> show perf
Performance monitoring not configured.
```

Currently, the only utilities that are available to aid in post-processing for call records and performance monitoring data are through *ForeView*. These utilities convert the call record and performance record file data from binary to ASCII format so that the information can be imported into databases or spreadsheet programs. For more information about these utilities, please refer to the *ForeView Network Management User's Manual*.

1.20.2 Configuring Memory Pools

These commands let you allocate memory pools of various data structures that are involved in call setups. These pools are considered to be the minimum numbers required for each type of connection. As a parameter's value is increased, the pools become larger and increase memory requirements. Similarly, as a parameter's value is decreased, the pools shrink and memory is freed. Any increases to these pools take effect immediately and are maintained over switch reboots. However, decreases may be slightly delayed if the parameters are changed and the data structures that are needed to change the pool size are already in use. For example, if you decrease the number of point-to-point calls from 500 to 300 and all of the calls are in use, that pool will not shrink until 200 calls have been released.

Typical values for these pools depend greatly on the requirements of your particular network. There is no specific maximum value for the pool sizes; they are only limited by the amount of memory available at the time of configuration. However, a pool configuration fails when there is not enough memory, or when there is memory available, but it is not available in the required block sizes (due to memory fragmentation). It is possible to allocate all of the memory to a pool by setting the pool to a very large value. Similarly, you can release all of the memory from a pool by setting the value to 0.

CAUTION

You should adjust these values only after careful consideration of your network's needs. It is important not to allocate more connections than you can possibly use when setting these pool sizes. When pools are configured, the memory in those pools is not available to any other operations such as the creation of static entities (PVCs, SPVCs, static routes, UPC contracts, etc.), call recording, and performance monitoring. Improper configuration can have an adverse effect on your network's operation.

You can configure the amount of memory allocated for call processing. The default memory pools setting is 2.0 MB on a 16 MB SCP and 2.8 MB on a 32 MB SCP. If you have too many PVCs, you can change the default configuration for point-to-point calls, or point-to-multipoint calls, or both to 0.

You can display the list of available subcommands by typing **?** at the **pools** level.

```
myswitch::configuration switch pools> ?
  pp                pmp               show
```

1.20.2.1 Configuring the Pool for Point-to-Point Calls

This command lets you reserve memory for a specific number of total point-to-point calls for this switch. Enter the following parameters:

```
myswitch::configuration switch pools> pp <no-of-point-to-point-calls>
```

This parameter is defined as follows:

Parameter	Description
no-of-point-to-point calls	The number of point-to-point calls you want to pre-allocate for this switch. The default is 256 calls for an SCP that has 16 MB of DRAM. The default is 512 calls for an SCP that has 32 MB of DRAM. The default is 1,024 calls for an SCP that has 64 MB of DRAM.

The SVC part of SPVC connections uses the pool resources for point-to-point calls.

1.20.2.2 Configuring the Pool for Point-to-Multipoint Calls

This command lets you reserve memory for a specific number of total point-to-multipoint calls for this switch. Enter the following parameters:

```
myswitch::configuration switch pools> pmp <no-of-point-to-multipoint-calls>
```

This parameter is defined as follows:

Parameter	Description
no-of-point-to-multipoint calls	The number of point-to-multipoint calls you want to pre-allocate for this switch. The default is 8 calls for an SCP that has 16 MB of DRAM. The default is 32 calls for an SCP that has 32 MB of DRAM. The default is 64 calls for an SCP that has 64 MB of DRAM.

1.20.2.3 Displaying Configured Pools

This command lets you display the pools that are configured on this switch. The default values will vary depending on the type of SCP installed in the switch. Enter the following:

```
myswitch::configuration switch pools> show
 Switch is configured for a TYPICAL load of:
         1024  Point-to-Point Calls
          64  Point-to-Multipoint Calls
```

The fields in this display are defined as follows:

Field	Description
Point-to-point Calls	Shows how many point-to-point calls you have reserved memory for on this switch.
Point-to-Multipoint Calls	Shows how many point-to-multipoint calls you have reserved memory for on this switch.

1.20.3 Setting or Changing the Switch Name

This command enables you to set or change the name of the switch. The switch name is shown on the front panel display LED. Enter the following parameters:

```
myswitch::configuration switch> name <name>
```

This parameter is defined as follows:

Parameter	Description
name	The new name for the switch. If no name has been set using this command, then `ATM SWITCH` is displayed on the front panel of the switch and as the prompt name.

When the switch name is changed using this command, the new switch name is stored in the CDB and persists across reboots. Also, the prompt name changes immediately[1] to match new switch name, as long as the prompt name has not been changed explicitly using the *<new-prompt>* option under **conf system prompt**. For example:

```
myswitch::configuration switch> name fishtank
fishtank::configuration switch>
```

1. If the switch name is changed using SNMP, you must log out and then log in again for the prompt name to change over to match the new switch name.

1.20.4 Setting the Maximum Number of Reserved VCIs for PMPs

This command lets you change the upper end of the range of the block of VCIs that are reserved for point-to-multipoint (PMP) SVCs on all paths and all ports on this switch fabric. This range defaults to 155-255, which ensures that 101 PMP SVCs can always be created regardless of the number of point-to-point (PP) SVCs. PVCs can be created on these VCIs, but no PP SVCs may use these VCIs. PMP SVCs attempt to allocate a VCI outside this range only if all of the VCIs in the range have already been allocated.

You should change the default range only if the number of PMP SVCs that the switch must always be able to set up is greater than 101. Each LANE 1.0 ELAN requires two or three PMP SVCs, so if you are using more than 33 ELANs, you should increase the PMP reserved VCI range. However, since older versions of software only support up to 255 VCIs and since all output paths must support the entire range, it is better to lower the minimum reserved PMP VCI instead of increasing the maximum.

Enter the following parameters:

```
myswitch::configuration switch> pmpmaxvci <vci>
```

This parameter is defined as follows:

Parameter	Description
vci	The top number for the range of VCIs to be reserved for PMP SVCs. The default is **255**.

1.20.5 Setting the Minimum Number of Reserved VCIs for PMPs

This command lets you change the lower end of the range of the block of VCIs that are reserved for point-to-multipoint (PMP) SVCs on all paths and all ports on this switch fabric. This range defaults to 155-255, which ensures that 101 PMP SVCs can always be created regardless of the number of point-to-point (PP) SVCs. PVCs can be created on these VCIs, but no PP SVCs may use these VCIs. PMP SVCs attempt to allocate a VCI outside this range only if all of the VCIs in the range have already been allocated.

You should change the default range only if the number of PMP SVCs that the switch must always be able to set up is greater than 101. Each LANE 1.0 ELAN requires two or three PMP SVCs, so if you are using more than 33 ELANs, you should increase the PMP reserved VCI range. However, since older versions of software only support up to 255 VCIs and since all output paths must support the entire range, it is better to lower the minimum reserved PMP VCI instead of increasing the maximum.

Enter the following parameters:

```
myswitch::configuration switch> pmpminvci <vci>
```

This parameter is defined as follows:

Parameter	Description
vci	The bottom number for the range of VCIs to be reserved for PMP SVCs. The default is **155**.

For example, to set the minimum reserved VCI to 100, which effectively increases the PMP reserved VCI range to support the creation of 156 PMP SVCs, enter the following parameters:

```
myswitch::configuration switch> pmpminvci 100
```

1.20.6 Displaying the Switch Configuration

This command lets you display switch configuration information including the switch name, the type of switch, the amount of time (in days, hours, and minutes) since the switch has been rebooted, the hardware version, the software version, the number of maximum virtual paths, the number of maximum virtual channels, the SPANS address of the switch, the range of the minimum and maximum number of reserved VCIs for point-to-multipoint connections, and the time zone set for the switch. Enter the following parameters:

```
myswitch::configuration switch> show
Switch 'fishtank', Type asx200bxtnx210, up 2 days 19:40
Hardware version B, Software version S_ForeThought_5.0.0 (1.13304)
Maximum Virtual Path Connections        32768
Maximum Virtual Channels                32768
SPANS address                           00000038f21c184a
PMP Minimum Reserved VCI                155
PMP Maximum Reserved VCI                255
Switch TimeZone                         N/A
```

If the display reads ‘ATM Switch’ in the Switch field in the first line, this indicates that the switch name has not been set. Use the **configuration switch name** command to assign a name.

If the Switch TimeZone field reads N/A, then this value has not been configured yet.

1.20.7 Setting the Time Zone

This command lets you set the time zone for your switch. You should set this before you set the time and date on the switch using the **oper date** command. Enter the following:

```
myswitch::configuration switch> timezone <none | timezone>
```

This parameter is defined as follows:

Parameter	Description
none	Allows you to disable the time zone setting that has been previously configured. This is useful if you entered a time zone incorrectly or if you no longer want a time zone set.
timezone	The time zone configured for this ATM switch. The switch supports and automatically converts from Standard to Daylight Savings time for the following time zones: **EST5EDT** (Eastern Standard Time), **CST6CDT** (Central Standard Time), **MST7MDT** (Mountain Standard Time), **PST8PDT** (Pacific Standard Time), **AKST9AKDT** (Alaska Standard Time).

Locations outside of the time zones listed above must supply the following POSIX standard 1003.1-1988 formula for switching between Daylight Savings Time and Standard Time:

stdoffset [dst[offset][, start[/time], end[/time]]]

These parameters are defined as follows:

Parameter	Description
std and dst	Indicates 3 or more bytes that designate standard (`std`) or Daylight Savings Time (`dst`). Only `std` is required; if `dst` is omitted, then it does not apply in this location. You can use uppercase or lowercase letters and any characters, except a leading colon(:), digits, comma (,), minus (-), plus (+), and ACSII NUL.
offset	The value to add to local time to equal Greenwich Mean Time. `offset` is of the form: **hh[:mm[:ss]]** Hour (`hh`) is required and can be a single digit between 0 and 24. Minutes (`mm`) and seconds (`ss`) are optional and are between 0 and 59. If no offset follows dst, it is assumed to be one hour ahead of std. If preceded by a "-", the time zone is east of the Prime Meridian; otherwise it is west (with an optional "+").
start[/time], end[/time]	`start` indicates the date when the change occurs from std to dst. `end` indicates the date when you change back. Both start and end are of the form: **Mm.n.d** `d` is the d-th day ($0 \le d \le 6$) of week `n` of month `m` of the year ($1 \le n \le 5$, $1 \le m \le 12$), where week 5 is the last `d` day in month m, which can occur in either the fourth or the fifth week). Week 1 is the first week in which the d-th day occurs. Day 0 is Sunday. time is of the same format as offset, except that no leading "-" or "+" is allowed. If time is not entered, the default of 02:00:00 is used.

1.21 System Configuration Commands

These commands let you configure dual SCP functionality, configure the transfer protocol to be used when transferring files, configure system message log features, configure the amount of time of non-activity after which an AMI session times out, and change the units for designating UPC contracts. You can display the list of available subcommands by typing **?** at the **system** level.

```
myswitch::configuration system> ?
  show              dualscp>          prompt            protocol
  syslog>           timeout           units
```

1.21.1 Displaying System Information

This command lets you display the amount of time of non-activity after which an AMI session will time out and display what type of units will be used when designating UPC contracts. You can get to this level by entering **show** at the **system** level. Enter the following parameters:

```
myswitch::configuration system> show
AMI Session Timeout                                  off
File transfer protocol                               tftp
UPC Units                                            cps
```

The fields in this display are defined as follows:

Field	Description
AMI Session Timeout	The number of minutes of no activity after which an AMI session will time out and exit you out of the session. The default is **5** minutes. A value of **off** means that the AMI session will not time out.
File transfer protocol	**ftp** means that FTP is the transfer protocol that is being used when performing file transfers on this SCP and **tftp** means that TFTP is being used.
UPC Units	**cps** indicates that UPC contracts are being configured and displayed in cells per second. **kbps** means that UPC contracts are being configured and displayed in kilobits per second. The default is **cps**.

1.21.2 Dual SCP Configuration Commands

These commands let you configure failover support in the ASX-200BX, ASX-1000, TNX-210, or TNX-1100 when two SCPs are installed in a single switch fabric.

Only SCP-ASXHAs, or later, support the dual SCP configuration. Using an earlier version SCP in a redundant configuration can cause irreparable damage to your switch fabric.

These commands are not available locally on an ASX-200WG or on an LE 155.

For proper synchronization of information between SCPs, ensure that the amount of free space on both SCPs is roughly equal before performing these commands.


```
myswitch::configuration system> dualscp ?
  autoremove       autosync         failover         primary
  reset            show             switchover       synchronize
  threshold
```

1.21.2.1 Configuring Dual SCP Automatic File Removal

You can configure the standby SCP to automatically delete unused files (i.e., old versions of switch software), if necessary, when files are being synchronized by the controlling SCP. Enter the following to enable or disable the `autoremove` feature:

```
myswitch::configuration system dualscp> autoremove (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that **`autoremove`** is enabled on the standby SCP. When enabled, the SCP automatically deletes unused files and directories as needed.
disable	Indicates that **`autoremove`** is disabled on the standby SCP. If disabled, you are not prompted and synchronization attempts fail in the event that there is not enough free space in FLASH. This is the default.

When the master SCP synchronizes the OS (configured using the **`conf sys dual sync os`** command), the standby SCP checks to see if there is sufficient memory on the FLASH for the OS that is being synchronized. If there is not and **`autoremove`** is **`enabled`**, any old OSs (not the CURRENT) are deleted. However, if there still is not sufficient memory, the CURRENT OS on the standby SCP is deleted as well.

1.21.2.2 Configuring Dual SCP Automatic Synchronization

When in dual SCP mode, you can configure the controlling SCP to perform file automatic synchronization with the **autosync** command. If autosync is enabled, the CDB is saved to the standby SCP every time the CDB is written to FLASH on the controlling SCP. The standby SCP then rereads the CDB once it has been completely received. In addition, you can configure the controlling SCP to automatically copy the password file to the standby SCP if changes are made to it.

The automatic synchronization of the CDB and password file can be disabled, but you must remember to manually update these files to the standby SCP when they are modified on the controlling SCP.

To configure automatic synchronization, enter the following at the prompt:

```
myswitch::configuration system dualscp> autosync (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that automatic synchronization will be enabled on the SCP. This is the default.
disable	Indicates that automatic synchronization will not be enabled on the SCP.

CAUTION

Enabling autosync does not cause the automatic synchronization of switch software; only the CDB, password file, and other system configuration files are synchronized.

1.21.2.3 Configuring SCP Failover

This command lets you enable or disable failover to a second SCP in the event of a hardware failure on the controlling SCP.

CAUTION

If failover is disabled, the standby SCP will not take control of the switch fabric if the controlling SCP fails, regardless of how other `dualscp` parameters are set.

To configure failover, enter the following at the prompt:

```
myswitch::configuration system dualscp> failover (enable | disable)
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that SCP failover will be enabled. This is the default.
disable	Indicates that SCP failover will be disabled.

1.21.2.4 Configuring the Controlling SCP

This command lets you designate which SCP is to control the switch at start-up. To designate the primary SCP, enter the following at the prompt:

```
myswitch::configuration system dualscp> primary (X | Y)
```

These parameters are defined as follows:

Parameter	Description
X	Indicates that the SCP in the left slot of the ASX-200BX or TNX-210 switch fabric (the top slot in an ASX-1000 or TNX-1100) is the primary SCP. This is the default.
Y	Indicates that the SCP in the right slot of the ASX-200BX or TNX-210 switch fabric (the bottom slot in an ASX-1000 or TNX-1100) is the primary SCP.

NOTE

The primary SCP and the controlling are not necessarily the same. “Primary” refers to the SCP that is supposed to control the switch after it boots. “Controlling” refers to the SCP that actually controls the switch. For example, if the SCP in slot X fails at start-up, the SCP in slot Y will control the switch even though it is not designated as the primary SCP.

1.21.2.5 Resetting the Standby SCP

This command lets you force the standby SCP to reboot. To do this, enter the following at the prompt:

```
myswitch::configuration system dualscp> reset
```

You are asked to confirm this command. Type **y** at the prompt to reset the standby SCP. Type **n** or press <**Enter**> at the prompt to cancel the command.

```
myswitch::configuration system dualscp> reset
Reset the standby processor [n]? n
```

1.21.2.6 Displaying Dual SCP Information

This command lets you display the settings for dual SCP mode. To view these settings, enter the following at the prompt:

```
myswitch::configuration system dualscp> show
                                        Auto    CDB       Sync     Sync
SCP State      Primary Failover Threshold Remove  SyncMode  Requests Failures
3X  standalone X       enable   2 secs    disable automatic        0        0
Synchronization queue: empty
Synchronization state: Suspended
```

The fields in this display are defined as follows:

Field	Description
SCP	The SCP for which the information is being displayed. For example, 3X indicates that information for the SCP in slot X of switch fabric 3 is being displayed.
State	The state of the SCP. **standalone** means that there is only one SCP in the switch fabric. **dual** means that there are two SCPs installed in the switch fabric, and the SCPs are communicating with one another. **other** means that there are two SCPs installed in the switch fabric, but they are not communicating with one another.
Primary	Shows which SCP (X or Y) is the primary SCP. The SCP in slot X is set to primary by default.
Failover	Shows if failover is enabled on the switch fabric. failover is enabled by default.
Threshold	The amount of time, in seconds, that the standby SCP waits to receive a heartbeat from the controlling SCP before taking control of the switch. The minimum and default threshold value is 2 seconds.

Field	Description
Auto Remove	Shows if autoremove is enabled on the standby SCP. autoremove is disabled by default.
CDB SyncMode	**automatic** means that CDB synchronization occurs automatically (**autosync** is enabled on the controlling SCP). **manual** means that CDB synchronization does not occur automatically (**autosync** is disabled on the controlling SCP). The default is **automatic.**
Sync Requests	The number of synchronization requests that have been made between the controlling and standby SCP.
Sync Failures	The number of synchronizations requests that have failed between SCPs.
Synchronization queue	The number of synchronization requests waiting to be processed.
Synchronization state[1]	The state of the current synchronization attempt between the controlling and standby SCP. **Suspended** means either that the switch is not in dual SCP mode, or that the SCPs are running different versions of switch software. **Idle** means that synchronization is not taking place between SCPs. **Manual** means that a manual synchronization is taking place between SCPs. **Automatic** means an automatic synchronization is taking place between SCPs.

1. When manual or automatic synchronization is taking place between SCPs, the name of the file being synchronized is also displayed.

1.21.2.7 Switching over to the Standby SCP

If you wish to force the standby SCP to take control of the switch, this command provides the ability to force a switchover from the controlling to the standby SCP. To force the standby SCP to take control of the switch, enter the following at the prompt:

```
myswitch::configuration system dualscp> switchover
```

You will be asked to confirm this command. Type **y** at the prompt to reset the backup SCP. Type **n** or press **<Enter>** at the prompt to cancel the command.

```
myswitch::configuration system dualscp> switchover
Switch over to the standby processor [n]? n
```

If you answer **y** to the above question, you will be prompted with the following question only if the standby SCP is in the process of synchronizing with the controlling SCP:

```
Dual SCP synchronization pending. continue anyway [n]? n
```

CAUTION

If this question is displayed, you should always answer **n**. Wait until the synchronization process is complete, then try the switch over again. If you switch over during the synchronization process, you will lose your configuration information.

1.21.2.8 Synchronizing Files Manually

To ensure a reliable failover mechanism, the information contained on both SCPs should be synchronized. Synchronizing the FLASH between SCPs is requested manually by the user via AMI. The CDB, password file, LECS configuration, and switch software version can also be synchronized between SCPs. If free space on the FLASH of the standby SCP is depleted during a synchronization attempt, the standby SCP removes unused files and directories if `autoremove` is enabled. However, if `autoremove` is enabled, and there are no files that can be deleted, the synchronization attempt fails. If `autoremove` is disabled, the synchronization attempt fails. To synchronize information between SCPs, enter the following:

```
myswitch::configuration system dualscp> synchronize (Flash | CDB | LECS | OS | Password
| Securid | Secret |Init | Loader)
```

These parameters are defined as follows:

Parameter	Description
Flash	Indicates that all directories and files in FLASH on the controlling SCP will be copied to the standby SCP.
CDB	Indicates that the Configuration Database (CDB) will be copied from the controlling to the standby SCP.
LECS	Indicates that the LAN Emulation Configuration Services (LECS) configuration database file will be copied from the controlling to the standby SCP.
OS[1]	Indicates that the switch software will be copied from the controlling SCP to the standby SCP.
Password	Indicates that the password file will be copied from the controlling SCP to the standby SCP. The password file contains all of the userid information.
Securid	Indicates that the SecurID `sdconf.rec` configuration file will be copied from the controlling SCP to the standby SCP.
Secret	Indicates that the SecurID `node secret` file will be copied from the controlling SCP to the standby SCP.
Init	Indicates that the FLASH on the standby SCP will be re-initialized.
Loader	Indicates that the Mini Loader will be copied from the controlling to the standby SCP.

1. Only the version of switch software to which `CURRENT` is pointing is copied to the standby SCP.

CAUTION

Using the **`Init`** option formats the FLASH on the standby SCP. This removes all information from the FLASH.

1.21.2.9 Setting the Failover Threshold

This command lets you set the threshold time, in seconds, that the standby SCP will wait to receive a heartbeat from the controlling SCP before taking control of the switch. Enter the following at the prompt:

```
myswitch::configuration system dualscp> threshold <seconds>
```

This parameter is defined as follows:

Parameter	Description
seconds	The threshold time, in seconds, that the standby SCP waits for a heartbeat from the controlling SCP. The minimum and default value is 2 seconds.

1.21.3 Displaying or Changing the Prompt

This command allows you to display the prompt name on the switch. Enter **prompt** at the **system** level as follows:

```
myswitch::configuration system> prompt
Current prompt is : myswitch
```

This command also lets you change the prompt name on the switch. Enter the following:

```
myswitch::configuration system> prompt ?
myswitch::configuration system> prompt [-default | <new-prompt>]
```

These parameters are defined as follows:

Parameter	Description
default	Changes the prompt name to match the switch name that was set using **conf switch name**. If the name was null, changes the prompt to ATM SWITCH::>. After an **oper cdb init**, changes the prompt to Unknown.
new-prompt	Allows you to change the prompt name to something other than the switch name that was set using **conf switch name**.

Changing the prompt name using the *<new-prompt>* option overrides the default prompt (which matches the switch name that has been set using **conf switch name**). The new prompt is stored in the CDB and persists across reboots.

When the switch name is changed using **conf switch name**, the prompt name changes immediately[1] to match it, as long as the prompt name has not been changed explicitly using the *<new-prompt>* option. If you want to change the prompt name back to the default (switch name) prompt, use the -default option.

This command is useful for shortening the prompt name if the switch name is very long. However, if you change the switch name after you have changed the prompt name, ensure that you go back and update the prompt name.

If you open a remote AMI session using the **open** command, an asterisk (*) is displayed in front of the remote switch's prompt to designate which one is the local switch and which is the remote one. Remote switches always use the remote switch's name as the prompt.

---

1. If the switch name is changed using SNMP, you must log out and then log in again for the prompt name to change over to match the new switch name.

1.21.4 Changing the System Protocol

This command lets you configure which transfer protocol is used when performing file transfers for the following AMI commands: **conf lane lecs get**, **conf security login backup**, and **conf security login restore**, **oper upgrade**, **oper cdb backup**, **oper cdb restore**, **oper flash get**, and **oper flash put**. To change the protocol that is used, enter the following parameters:

```
myswitch::configuration system> protocol [(ftp | tftp)]
```


This parameter is defined as follows:

Parameter	Description
ftp | tftp	**ftp** means that FTP is the transfer protocol to be used when performing file transfers on this SCP and **tftp** means that TFTP is to be used. The default value is **tftp**.

To display the protocol that is currently being used, enter **protocol** at the **system** level:

```
myswitch::configuration system> protocol
Default transfer protocol : tftp
```

This field is defined as follows:

Parameter	Description
Default Transfer Protocol	**ftp** means that FTP is the transfer protocol that is being used when performing file transfers on this SCP and **tftp** means that TFTP is being used.

When the transfer protocol is set to FTP, each time that you use a command that requires the use of FTP, you are prompted for the remote userid and password of the remote host to which you are transferring a file or from which you are retrieving a file. For example:

```
myswitch::operation> upgrade <remotehost>:<full path to remotefile>
  Will upgrade directly to flash
  remote userid: <remote userid>
  remote password: <remote password>
```

1.21.5 System Log Configuration Commands

Syslog is a tool that can send system messages to be logged to a user-specified remote host. These commands let you configure the address of the remote syslog host and whether or not these messages are sent to the console. Enter **syslog ?** at the **system** level to show the list of available **syslog** commands.

```
myswitch::configuration system> syslog ?
  show              set               delete           console
  audit>
```

1.21.5.1 Displaying the Address of the System Log Host

This command allows you to display the address of the host to which the switch's system messages are logged. Enter the following parameters:

This command is only available on the local switch.

```
myswitch::configuration system syslog> show
Remote Syslog Host: 169.144.1.216
Syslog Facility: daemon
Console: enabled
```

If the host's address has never been set, or if it has been deleted and not set again, the following is shown:

```
myswitch::configuration system syslog> show
No remote syslog host set. Syslog messages will not be sent.
Syslog Facility: daemon
Console: enabled
```

1.21.5.2 Setting the Address of the System Log Host

This command sets the address of the host to which the switch's system messages are being logged. You may also opt to assign a specific facility name so that the remote syslog can automatically differentiate between switches with different facilities. Enter the following:

This command is only available on the local switch.

```
myswitch::configuration system syslog> set <address> [<facility>]
```

These parameters are defined as follows:

Parameter	Description
address	The IP address of the remote host to which the switch's system message logs are sent.
facility	The user-assigned name that identifies the facility this switch sends syslogs on. The default is **daemon**. Other valid values are **local0** through **local7**. The names may be assigned in any order.

For example, to have a host with the address 192.88.243.118 be the recipient of the system log messages and to designate this switch's facility name as `local2`, enter the following:

```
myswitch::configuration system syslog> set 192.88.243.118 local2
Remote Syslog Host: 192.88.243.118
Syslog Facility is now local2
```

To assign the facility for other switches in your network, you must log in to each one locally and set the facility. You must keep track of which facility was assigned to each switch. Then, when you view the contents of the syslog file, they can be separated according to facility when messages from different facilities are logged on the same remote host.

If the switch panics, the panic file is automatically written to the syslog, provided that a syslog host had been set prior to the panic. This is especially useful if multiple panics occur, so that each is recorded.

1.21.5.3 Deleting the Address of the System Log Host

This command allows you to delete the address of the host to which the switch's system messages are being logged. Enter the following parameters:

This command is only available on the local switch.

```
myswitch::configuration system syslog> delete

Remove 192.88.243.118 as remote syslog host [n]? y
Remote syslog host removed. Syslog messages will not be sent.
Syslog Facility: local7
```

The switch prompts you to confirm that the address should be deleted. Entering **y** causes the switch to delete the address, as shown above. If you do not want the address to be deleted, enter **n** or press **<RETURN>** and you will be sent back to the **syslog** prompt.

Once the host's address has been deleted, the switch's system messages are no longer logged until a new host address is set. However, if a facility has been assigned to the switch, that facility assignment remains intact. So if you assign another host without changing the facility, the new host will list this switch's syslog messages under the same facility. For example,

```
myswitch::configuration system syslog> show
Remote Syslog Host: 169.144.48.41
Syslog Facility: local7

myswitch::configuration system syslog> delete
Remove 169.144.48.41 as remote syslog host [n]? y
Remote syslog host removed. Syslog messages will not be sent.

myswitch::configuration system syslog> show
No remote syslog host set. Syslog messages will not be sent.
Syslog Facility: local7

myswitch::configuration system syslog> set 204.95.89.84
Remote Syslog Host: 204.95.89.84

myswitch::configuration system syslog> show
Remote Syslog Host: 204.95.89.84
Syslog Facility: local7
```

1.21.5.4 Turning Off or Turning On System Log Messages to the Console

On a switch, the system log messages may be directed to three places: to syslog, to the console, and to a remote host. These types of switches are defaulted to send log messages to both the console and to syslog. The **console** command can be used in different ways.

To display whether or not log messages are being output to the console, enter **console** without any arguments as follows:

```
myswitch::configuration system syslog> console
```

If the messages are being sent to the console, the following message is shown:

```
Syslog console output is enabled.
```

If the messages are not being directed to the console, the following message is displayed:

```
Syslog console output is disabled.
```

To enable log messages to be sent to the console, or to stop log messages from being output to the console, enter **console** with the appropriate argument as follows:

```
myswitch::configuration system syslog> console [(enable|disable)]
```

These parameters are defined as follows:

Parameter	Description
enable	Indicates that all log messages will be written to the console.
disable	Indicates that no log messages will be written to the console.

1.21.5.5 Enabling or Disabling the Logging of Changes

This command allows you to enable or disable the logging of all changes that occur on a switch via AMI, via SNMP, or via ILMI. Enter **?** at the **audit** level to show the list of available commands.

```
myswitch::configuration system syslog audit> ?
  show              ami               snmp            ilmi
```

1.21.5.5.1 Displaying the Auditing State

This command allows you to display whether the changes that occur on a switch via AMI, via SNMP, or via ILMI will be logged to syslog, and at what priority level those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> show
 Facility    Priority
 ami         debug
 snmp        notice
 ilmi        off
```

The fields in this display are defined as follows:

Field	Description
Facility	Shows for which facility the changes will be logged.
Priority	Shows with which priority level tag the changes will be logged.

You can also display the auditing state for a specific facility as follows:

```
myswitch::configuration system syslog audit> show [ami | snmp | ilmi]
myswitch::configuration system syslog audit> show ami
 Facility    Priority
 ami         debug
```

The fields in this display are defined in the same manner as those in the previous example.

1.21.5.5.2 Changing and Displaying the AMI Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via AMI. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> ami ?
usage:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of crit.
err	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all AMI changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all AMI changes to syslog. This is the default state.

In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command **`conf system syslog set`** to do this.

Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful as a security feature for logging any minor modifications which occur after that.

The AMI syslog messages generally come in pairs with the result of the first message saying `Pending`, and the second message giving the outcome. There are some exceptions, such as any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The AMI syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: AMI :: userid :: IP address or serial port (where
the user logged in) :: AMI command string :: result of command
```

For example, the output will be something similar to the following:

```
AUG 28 12:36:40 fishtank AMI :: ami :: 169.144.87.22 :: snmp off :: Pending
AUG 28 12:36:41 fishtank AMI :: ami :: 169.144.87.22 :: snmp off :: Success
```

You can also display the auditing state for AMI by entering **`ami`** without a ? as follows:

```
myswitch::configuration system syslog audit> ami
 Facility    Priority
 ami         debug
```

1.21.5.5.3 Changing and Displaying the SNMP Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via SNMP SETs. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> snmp ?
usage:[emerg | alert | crit | err | warning | notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of crit.
err	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all SNMP changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all SNMP changes to syslog. This is the default state.

In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command **`conf system syslog set`** to do this.

Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful for logging any minor modifications which occur after that.

The SNMP syslog messages generally come in pairs with the result of the first message saying `Pending`, and the second message giving the outcome. There are some exceptions, such as the SNMP bad community message, or any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The SNMP syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: SNMP :: IP address :: SNMP request ID :: index
of this varbind within the SNMP packet :: result of the command; either pending, success,
error number, no change, or bad community :: object ID for this varbind :: value
```

For example, the output will be something similar to the following:

```
AUG 28 11:09:50 fishtank SNMP :: 127.0.0.1 :: 7d92 :: 1 :: pending   ::
.1.3.6.1.4.1.326.2.2.2.2.2.4.0 :: 2
AUG 28 11:09:50 fishtank SNMP :: 127.0.0.1 :: 7d92 :: 1 :: success   ::
.1.3.6.1.4.1.326.2.2.2.2.2.4.0 :: 2
AUG 28 10:59:21 fishtank SNMP :: 169.144.87.21 :: 289d98ca :: 1 :: bad community ::
.1.3.6.1.2.1.2.2.1.7.3 :: 2
```

You can also display the auditing state for SNMP by entering **`snmp`** without a ? as follows:

```
myswitch::configuration system syslog audit> snmp
 Facility    Priority
 snmp        off
```

1.21.5.5.4 Changing and Displaying the ILMI Auditing State

This command allows you to enable or disable the logging of all of the changes that occur on a switch via ILMI. You can also configure with which priority level tag all of those changes will be logged. Enter the following parameters:

```
myswitch::configuration system syslog audit> ilmi [emerg | alert | crit | err | warning
| notice | info | debug | off]
```

These parameters are defined as follows:

Parameter	Description
emerg	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of emerg.
alert	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of alert.
crit	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of crit.
err	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of err.
warning	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of warning.
notice	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of notice.
info	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of info.
debug	Indicates you are enabling the logging of all ILMI changes to syslog with a priority level tag of debug.
off	Indicates you are disabling the logging of all ILMI changes to syslog. This is the default state.

In order for the actual logging to begin, you must first have a remote syslog host configured to receive the messages. Use the command **conf system syslog set** to do this.

Because the logging of each change can generate a lot of extra traffic, it is recommended that you enable this feature only after you have reached your initial desired configuration. This tool is most useful for logging any minor modifications which occur after that.

The ILMI syslog messages generally come in pairs with the result of the first message saying `Pending`, and the second message giving the outcome. There are some exceptions, such as any change that makes it impossible to send the result to syslog (such as rebooting the switch).

The ILMI syslog messages are output in a format that is similar to the following:

```
date time IP address or switch name :: ILMI :: port VPI VCI on which the request arrived
for ILMI :: SNMP request ID :: index of this varbind within the SNMP packet :: result
of the command; either pending, success, error number, no change, or bad community ::
object ID for this varbind :: value
```

For example, the output will be something similar to the following:

```
AUG 28 11:10:54 fishtank ILMI :: 1A2 0 16 :: 432b :: 1 :: pending   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
AUG 28 11:10:54 fishtank ILMI :: 1A2 0 16 :: 432b :: 1 :: success   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
AUG 28 11:10:54 fishtank ILMI :: 1A1 0 16 :: 4330 :: 1 :: pending   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
AUG 28 11:10:54 fishtank ILMI :: 1A1 0 16 :: 4330 :: 1 :: success   ::
.1.3.6.1.4.1.353.2.7.1.1.3.0.13.71.0.5.128.255.225.0.0.0.242.26.41.212 :: 1
```

You can also display the auditing state for ILMI by entering **`ilmi`** without a ? as follows:

```
myswitch::configuration system syslog audit> ilmi
 Facility    Priority
 ilmi        notice
```

1.21.6 AMI Timeout Configuration Command

This command lets you set the amount of time of non-activity after which an AMI session will time out. You can get to this level by entering **timeout** at the **system** level. Enter the following parameters:

```
myswitch::configuration system> timeout <minutes>
```

This parameter is defined as follows:

Parameter	Description
minutes	The number of minutes of non-activity after which an AMI session will time out and exit you out of the session. The default is 5 minutes. To configure the switch so that an AMI session does not time out, enter 0. It is displayed as off when you use **conf system show**.

1.21.7 Configuring the Units for UPC Contracts

This command allows you to change the type of units that are being used when configuring and displaying UPC contracts. You can get to this level by entering **units** at the **system** level. Enter the following parameters:

```
myswitch::configuration system> units (cps | kbps)
```

This parameter is defined as follows:

Parameter	Description
units	Using **cps** indicates that UPC contracts are being configured and displayed in cells per second. Using **kbps** means that UPC contracts are being configured and displayed in kilobits per second. The default is **cps**.

1.22 Timing Configuration Commands

These commands let you configure distributed timing on a switch. You can display the list of available subcommands by typing **?** at the **timing** level.

```
myswitch::configuration timing> ?
  mode                show                switchclock
```

1.22.1 Configuring the Timing Mode

This command lets you configure the method of timing operation used on the switch. Enter the following parameters:

```
myswitch::configuration timing> mode (switch | tcm)
```

These parameters are defined as follows:

Parameter	Description
switch	All network modules that support distributed timing import their clock source from the port designated under **conf timing switchclock**. This is the default mode.
tcm	All network modules that support distributed timing import their clock source from the Timing Control Module (TCM). If either of the primary or secondary clocks (set under **conf timing switchclock**) are on this switch, they are exported as the board primary and secondary clocks. The TCM must also be configured either to use these clocks (under **conf cec timing**), or to provide a BITS or the on-board oscillator as a timing source for the switch fabrics. You must have a TCM installed in your switch to use this mode.

For more information about configuring timing using the `switch` mode, see the Network Configuration manual for your switch. For more information about configuring timing using the `tcm` mode, see the CEC-Plus Installation and User's manual for your TCM.

1.22.2 Displaying Timing Information

This command lets you show the timing configuration on a switch fabric. Enter the following:

```
myswitch::configuration timing> show
Mode    Primary  Secondary  Current
switch  N/A      N/A        crystalC
```

The fields in this display are defined as follows:

Field	Description
Mode	The method of timing being used by the switch. **switch** means all network modules that support distributed timing import their clock source from the port designated under **conf timing switchclock**. **tcm** means all network modules that support distributed timing import their clock source from the TCM.
Primary	The port that has been configured as the primary switchclock for all of the network modules on all of the boards in this switch. These are the sources that this board is offering as primary timing sources. Any further behavior is dependent on the current mode.
Secondary	The port that has been configured as the secondary switchclock for all of the network modules on all of the boards in this switch. These are the sources that this board is offering as secondary timing sources. Any further behavior is dependent on the current mode.
Current	The current switchclock source for all of the network modules on all of the boards in this switch. If neither the primary nor secondary clocks are available, the switch fabric uses the crystal of the first available timing network module as the switchclock, going from A to D. For example, if network module A supports distributed timing, then the crystal from A is used as the switchclock. As another example, if network module A is not installed, and network modules B and C do not support distributed timing, but network module D does support distributed timing, then the crystal from D is used as the switchclock.

1.22.3 Configuring the Switchclock

This command lets you configure the primary or secondary switchclock on a switch fabric. Enter the following parameters:

```
myswitch::configuration timing> switchclock (primary | secondary) (<bnp> | none)
```

These parameters are defined as follows:

Parameter	Description
primary	The specified port will be designated as the primary switchclock.
secondary	The specified port will be designated as the secondary switchclock.
bnp	The number of the port that will be designated as the primary or secondary switchclock.
none	Resets the switchclock to the default values.

1.23 Signalling Configuration Commands

These commands let you configure ATM Forum (UNI/PNNI) signalling channels. You can display the list of available subcommands by typing **?** at the **signalling** level.

```
myswitch::configuration> signalling> ?
  delete           modify           new              show
```

1.23.1 Deleting a Signalling Channel

This command allows you to delete an existing signalling channel. Enter the following parameters:

```
myswitch::configuration signalling> delete <port> <vpi>
```

1.23.2 Modifying a Signalling Channel

This command allows you to modify an existing signalling channel. Enter the following parameters:

```
myswitch::configuration signalling> modify <port> <vpi>
        [-incomingfilter <filter-id> | -none ]
        [-outgoingfilter <filter-id> | -none ]
        [-defaultcpn (<NSAPaddress> | enable | disable) ]
        [-iefilter (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal]
                        | enable | disable)]
        [-iepass   (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal])]
```

1.23.3 Creating a Signalling Channel

This command lets you create a signalling channel. Enter the following parameters:

Before a signalling channel can be created on a given VPI, an originating and a terminating path must exist for that same VPI.

```
myswitch::configuration signalling> new <port> <vpi>
        [-version (auto | uni30 | uni31 | pnni10)]
        [-ilmi (up | down)] [-side (user | network)]
        [-type (auto | publicUNI | IISP | privateNNI | privateUNI)]
  atm layer options:
        [-sigvci <vci>] [-ilmivci <vci>]
        [-insigupc <upc-index>] [-outsigupc <upc-index>]
        [-minvci <vci>] [-maxvci <vci>]
  protocol options:
        [-sig_alloc (vp | link | auto)]
        [-sig_mode (nonAssoc | vpAssoc | auto)]
        [-qos_exp <QoSExpIndex>]
        [-carrier_loss_action (clearCalls | noClear)]
  atmroute options:
        [-cost <cost>] [-domain <domain>]
  timer options:
        [-sscopnoresp_timer <sec>]
  public options:
        [-ilmireg (disable | ignore)]
        [-addressformat (private | e164)]
        [-e164address <e164Address>]
        [-e164mapping (enable | disable)]
        [-plantype (international | national | subscriber)]
  iefilter (Information Element filtering) options:
        [-iefilter (one or more of: [cg,cgs,cds,blli,blli23,bhli,aal])]
        [-defaultcpn <NSAPAddress>]
  NSAP Address Filtering options:
        [-incomingfilter <filter-id>]
        [-outgoingfilter <filter-id>]
```

These parameters for delete, modify, and new are defined as follows:

Parameter	Description
port	The port number of the signalling channel.
vpi	The virtual path number of the signalling channel.
version	The version of the UNI protocol to use at initialization. **auto** means the UNI attempts to determine automatically which version of the UNI protocol to use. **auto** is the default. **uni30** means this link uses version 30 of the UNI protocol. **uni31** means this link uses version 31 of the UNI protocol. **pnni10** means this link is an ATM Forum PNNI link. You must specify both the version and the type if you want one of them to be something other than **auto**. For a list of the allowable combinations and more information, see the Network Configuration manual for your switch.
ilmi	Enables ILMI for this interface (only when a host is connected). However, this parameter must be set to **down** if you set the interface type parameter to **IISP**. The default is **up**.
side	The switch user side or network side. If the connection is to a host, choose **network**. If the connection is to another switch, one switch must be **user** and the other switch must be **network** when configuring the interface `type` as **IISP** or as **publicUNI**. If the `type` is not **IISP** or **publicUNI**, then you do not need to specify this value; it is determined automatically.
type	The interface type to use for this signalling channel. **auto** means the interface type is determined dynamically. **publicUNI** means this signalling channel is used between this switch and a public switch. **IISP** is used for switch-to-switch signalling. **privateNNI** means this signalling channel is using the PNNI protocol. **privateUNI** means this signalling channel is used between this switch and a host. The default is **auto**. You must specify both the version and the type if you want one of them to be something other than **auto**. For a list of the allowable combinations and more information, see the Network Configuration manual for your switch.
sigvci	The VCI to use for signalling messages.
ilmivci	The VCI to use for ILMI messages.
insigupc	The index number of the UPC traffic contract to be applied to the input signalling channel. Use **conf upc show** and look at the `Index` field to find this number.
outsigupc	The index number of the UPC traffic contract to be applied to the output signalling channel. Use **conf upc show** and look at the `Index` field to find this number. To prevent the outbound signalling channel from being policed, you must use the **noGCRA** option when creating the UPC contract.
minvci	The bottom number for the range of VCIs to be reserved for UNI SVCs on this path (and other paths created dynamically if the `-sig_alloc` flag is `link`). You can change this range to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs. The default is **32**.

Parameter	Description
maxvci	The top number for the range of VCIs to be reserved for UNI SVCs on this path (and other paths created dynamically if the `-sig_alloc` flag is `link`). You can change this range to limit the number of SVCs on this path, limit the number of SPANS SVCs with respect to UNI SVCs, or divide the VCI range into a region reserved for SPANS SVCs and a region reserved for UNI SVCs. The default is the maximum number of VCIs on the containing path.
sig_alloc	The allocation policy for the network side of a signalling channel. **`vp`** means the network side allocates connections in its containing VP only. **`link`** means the signalling channel allocates connections in its containing VP and may allocate connections in other VPs in the VPI range 0 to 255 that are available to it. The **`link`** option is only available for signalling channels on VP 0. The **`link`** option cannot be specified when **`-sig_mode`** is specified as **`vpAssoc`**. The default is **`vp`** for FT-PNNI and **`link`** for PNNI. You must specify both the sig_alloc and the sig_mode if you want one of them to be something other than **`auto`**. For a list of the allowable combinations and more information, see the Network Configuration manual for your switch.
sig_mode	The mode to be used for signalling. **`nonAssoc`** (Non-associated signalling) means the signalling channel encodes the connection identifier with Non-associated signalling bits. **`vpAssoc`** (VP-associated signalling) means the signalling channel encodes the connection identifier with the VP-associated signalling bits. The default is **`nonAssoc`** for FT-PNNI and **`vpAssoc`** for PNNI, except VP 0 which must be **`nonAssoc`**. You must specify both the sig_alloc and the sig_mode if you want one of them to be something other than **`auto`**. For a list of the allowable combinations and more information, see the Network Configuration manual for your switch.
qos_exp <QoSExpIndex>	The index number in the QoS expansion table that is used to do QoS class-to-parameter expansion when calls originating on this interface are routed through a PNNI network. See the `QoSExpIndex` field under **`conf qos show`** for this number.
carrier_loss_action	The action to be taken on this signalling channel upon sensing a carrier loss. **`clearCalls`** means that, upon sensing a carrier loss, the switch immediately tears down all the connections (both active calls and calls in the establishment phase) on this signalling channel. **`noClear`** means that, upon sensing a carrier loss, the switch waits until the SSCOP timer expires and then clears the calls in the establishment phase on this signalling channel. The active calls on this signalling channel take even longer to be cleared. The default is **`noClear`**.
cost	The cost (administrative weight) of this link that is used for determining the best route for this signalling channel in FT-PNNI.
domain	The index number of the PNNI domain to which this signalling channel belongs. To find this number, look in the `ID` field under **`conf atmroute domain show`**.
sscopnoresp_timer	The value to be set for the duration of the SSCOP no response timer. This is the time in seconds to wait before bringing the SSCOP connection down. This parameter can be set to a value higher than the default when the remote host is experiencing a heavy load and cannot process a signalling request in time. The default is **`10`** seconds for UNI 3.0 and **`7`** seconds for UNI 3.1.

Parameter	Description
ilmireg	**disable** means no prefix registration messages are sent by the network-side, and no address registration messages are generated by the user-side. **ignore** means the network-side performs as it normally would, except that addresses registered are not published into the routing database. This is not recommended except in public network situations in which CPE2 equipment needs ILMI address registration in order to function correctly. The default is **disable**. This option may be used for signalling channels other than public UNIs (i.e., specifying automode or IISP above). However, for those signalling channels, ILMI registration is enabled by default (even though it is not an option to be specified here.) This means that ILMI address and prefix registration will occur across those signalling channels.
addressformat	Indicates whether to use the native E.164 address format (used by public UNI) across this signalling channel or to use the private address format. If you specify **e164**, you can also specify a plantype. (If you specify **private**, the switch automatically uses the correct corresponding plantype.) For a list of the allowable combinations and more information, see the Network Configuration manual for your switch.
e164address	The native e164 address used by public UNI across this signalling channel.
e164mapping	Indicates whether or not to resolve private NSAP addresses into native E.164 addresses. Enable means NSAP address-to-E.164 address mapping occurs. Disable means NSAP address-to-E.164 address mapping will not occur. However, if you use disable, but you are also using the native E.164 address format, then the only address conversion performed at this signalling channel is for private NSAP addresses in E.164 format.
plantype (international | national | subscriber)	The plan type to be used in the calling party number and called party number information elements in the signalling messages. You can set this variable if the address format is specified as **e164**. You cannot set it if the address format is specified as **private**. By default, **international** is used with the **e164** address format. By default, **unknown** is used with the **private** address format.
iefilter (enable | disable)	The information element (IE) filter which controls the filtering of signalling elements of the UNI 3.x signalling channels. Filters can be applied to the following UNI 3.x IEs: **cg**, **cgs**, **cds**, **blli**, **blli23**, **bhli**, **aal**. **enable** means that the listed elements will not be passed to the called party (they are filtered). Any IEs that are not listed here will be passed to the called party. When using this parameter with **conf signalling new**, filtering is enabled for any IEs that you specify. You can then later use this parameter with **conf signalling modify** to disable filtering of the specified IEs without changing the list.
iepass	Allows the specified IEs to be passed to the called party. Can use the following UNI 3.x IEs: **cg**, **cgs**, **cds**, **blli**, **blli23**, **bhli**, **aal**.
cg	Filters the address of the calling party on calls going out on this interface.
cgs	Filters the subaddress of the calling party on calls coming in on this interface.
cds	Filters the subaddress of the called party on calls coming in on this interface.
blli	Filters all (first, second, and third) Broadband Low Layer Information (BLLI) IEs, which provides compatibility checking by an addressed entity on calls coming in on this interface. This information is transferred transparently between the calling and the called party.

Parameter	Description
blli23	Filters only the second and third Broadband Low Layer Information (BLLI) IEs on calls coming in and going out on this interface.
bhli	Filters the Broadband High Layer Information (BHLI), which provides compatibility checking by an addressed entity (e.g., a recipient of a call) on calls coming in on this interface.
aal	Filters the AAL (ATM Adaptation Layer) information on calls coming in and going out on this interface.
defaultcpn (<NSAPaddress> | enable | disable)	The default calling party number (CPN) to be inserted in an incoming call setup message, if the originator does not provide an address in the call setup request. Specifying an <*NSAPaddress*> and **enable** means that this address will be used as the default CPN for incoming call setup messages without a CPN. Specifying an <*NSAPaddress*> address and **disable** means that an incoming call setup message without a CPN will be treated as if it has a CPN of all zeros. A template can be created to check for this condition.
incomingfilter <filter-id> | -none	<filter-id> indicates the NSAP filter (from **conf security nsapfilter filters show**) to be applied to calls arriving at this signalling channel. You can remove this filter later by using **conf signalling modify incomingfilter -none**.
outgoingfilter <filter-id> | -none	<filter-id> indicates the NSAP filter (from **conf security nsapfilter filters show**) to be applied to calls leaving on this signalling channel. You can remove this filter later by using **conf signalling modify outgoingfilter -none**.

1.23.4 Displaying Signalling Channels

This command allows you to list an individual switch fabric's current signalling channel information. Enter the following parameters:

```
myswitch::configuration signalling> show
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1A1    0 privateUNI(a)  uni30(a)   down  down network
*1A2    0 privateUNI(a)  uni31(a)   up    up   network 172.19.12.141
 1A3    0 privateUNI(a)  uni31(a)   down  down network
 1A4    0 privateUNI(a)  uni30(a)   down  down network
 1B1    0 FT-PNNI(a)     uni31(a)   up    up   user    169.144.64.59
 1B2    0 privateUNI(a)  uni30(a)   down  down network
 1B3    0 FT-PNNI(a)     uni31(a)   up    up   network 172.19.12.58
 1B4    0 privateUNI     uni30      up    down network 172.19.12.139
 1C1    0 privateUNI(a)  uni30(a)   down  down network
 1C2    0 privateUNI     uni31      up    up   network 172.19.12.140
 1C3    0 PNNI(a)        pnni10(a)  up    up   network 172.19.12.57
 1C4    0 PNNI           pnni10     up    up   network 169.144.64.58
 1CTL   0 privateUNI(a)  uni30(a)   up    down network
```

The fields in this display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled. An asterisk (*) to the left of the port number means that signalling channel is still being created and is not active yet.
VPI	The number of the virtual path that contains the signalling channel.
Interface	The operational type of the interface on this signalling channel. **publicUNI** means that this signalling channel is operating between this switch and a public switch. **privateUNI** means this signalling channel is operating between the switch and a host. **IISP** (Interim Inter-Switch Signalling Protocol) means this signalling channel is used between two switches. **FT-PNNI** is used between two switches using SPANS mapping messages for dynamic routing. **PNNI** means this signalling channel is using the PNNI protocol. **(a)** means that the switch is trying to automatically determine the appropriate interface type.
SigVersion	The version of the UNI or PNNI protocol being used at initialization. **uni30** means that this link uses version 30 of the UNI protocol. **uni31** means that this link uses version 31 of the UNI protocol. **auto** means that this link attempts to determine automatically which version of the UNI protocol to use. **pnni10** means this link is an ATM Forum PNNI link. **(a)** means that the switch is trying to automatically determine the protocol and version of that protocol that its peers are using.

Field	Description
State	The current state of the interface. If the state is **up**, this interface is operational. This is the normal state for a interface that is connected to another FORE Systems' ATM switch or host. If the state is **down**, this interface is not operational. This can be due to a lack of a physical connection or due to a software problem.
ILMI	**Up** means that ILMI is operational for this interface. **Down** means that ILMI is not operational for this interface.
Side	Shows if the switch is the user side or the network side on a given signalling channel. If the connection is to a host, **network** is displayed. If the connection is to another switch, one switch must be **user** and the other switch must be **network**.
RemoteAddress	The IP address of the remote endstation, if it is available.

To display information for all of the signalling channels on a specific port, (for example, port 1B1), enter the following parameters:

```
myswitch::configuration signalling> show 1b1
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1B1    0 ftPNNI         uni31(a)   up    up   network
```

The fields in this display are defined in the same manner as those in the previous example.

To display information for all of the signalling channels on a specific port and path, (for example, port 1B1 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b1 0
 Port VPI Interface      SigVersion State ILMI Side    RemoteAddress
 1B1    0 ftPNNI         uni31(a)   up    up   network
```

The fields in this display are defined in the same manner as those in the previous example.

Additionally, there are several options you can use to show different types of information about the signalling channels.

```
myswitch::configuration signalling> show [<port> [<vpi>]]
[atm | protocol | atmroute | timers | public | iefilter | nsapfilter ]
```

These options are described in the following subsections.

1.23.4.1 Displaying ATM Layer Information for Signalling Channels

To show ATM layer information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show atm
                  Admin  Admin   Oper   Oper
 Port VPI SigVCI ILMIVCI MinVCI MaxVCI MinVCI MaxVCI InSigUpc OutSigUpc
 1A1    0      5      16     32    511     32    511        0       N/A
 1A2    0      5      16     32    511     32    511        0       N/A
 1A3    0      5      16     32    511     32    511        0       N/A
 1A4    0      5      16     32    511     32    511        0       N/A
 1B1    0      5      16     32    511     32    511        0       N/A
 1B2    0      5      16     32    511     32    511        0       N/A
 1B3    0      5      16     32    511     32    511        0       N/A
 1B4    0      5      16     32    511     32    511        0       N/A
```

The fields in the ATM display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
SigVCI	The VCI on the signalling channel. The default reserved VCI is **5**.
ILMIVCI	The VCI to be used for ILMI signalling messages. The default reserved VCI is **16**.
Admin MinVCI	The user-requested bottom number for the range of VCIs to be reserved for UNI SVCs on this path. If no value is entered, the default is **32**.
Admin MaxVCI	The user-requested top number for the range of VCIs to be reserved for UNI SVCs on this path. If no value is entered, the default is the maximum number of VCIs on the containing path.
Oper MinVCI	The actual (operational) bottom number for the range of VCIs to be reserved for UNI SVCs on this path. A value that is displayed in brackets indicates that negotiation of this value with the UNI peer via ILMI is not complete because either ILMI is not up, or if ILMI is up, the negotiation is still in progress. A value that is displayed without brackets indicates the value has been successfully negotiated (if ILMI is enabled and up) or negotiation did not need to take place (if ILMI is disabled). For more information, see the Network Configuration manual for your switch.
Oper MaxVCI	The actual (operational) top number for the range of VCIs to be reserved for UNI SVCs on this path. A value that is displayed in brackets indicates that negotiation of this value with the UNI peer via ILMI is not complete because either ILMI is not up, or if ILMI is up, the negotiation is still in progress. A value that is displayed without brackets indicates the value has been successfully negotiated (if ILMI is enabled and up) or negotiation did not need to take place (if ILMI is disabled). For more information, see the Network Configuration manual for your switch.

Field	Description
InSigUpc	The index number of the UPC traffic contract that is applied to the input signalling channel. UPC contracts can be displayed using **conf upc show**.
OutSigUpc	The index number of the UPC traffic contract that is applied to the output signalling channel. UPC contracts can be displayed using **conf upc show**. N/A indicates that the output signalling channel is not tied to any UPC index.

To list ATM information for all of the signalling channels on a specific port and path, (for example, port 1B2 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b2 0 atm
                 Admin  Admin   Oper   Oper
 Port VPI SigVCI ILMIVCI MinVCI MaxVCI MinVCI MaxVCI InSigUpc OutSigUpc
 1B2    0      5      16     32    511     32    511        0       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

1.23.4.2 Displaying Protocol Information for Signalling Channels

To show protocol information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show protocol
          Allocation
 Port VPI  Scope       Mode              QoSExpIndex CarrierLossAction
 4B1    0  VP(a)       Non-Associated(a)           0 noClear
 4B3    0  Link(a)     Non-Associated(a)           0 noClear
 4B3    1  VP(a)       VP-Associated(a)            0 noClear
 4B3    2  VP(a)       VP-Associated(a)            0 noClear
 4B3    3  VP(a)       VP-Associated(a)            0 noClear
 4B3    4  VP(a)       VP-Associated(a)            0 noClear
 4B4    0  Link(a)     Non-Associated(a)           0 noClear
 4E1    0  VP(a)       VP-Associated(a)            0 noClear
 4E2    0  VP(a)       Non-Associated(a)           0 noClear
 4E3    0  VP(a)       Non-Associated(a)           0 noClear
 4CTL   0  VP(a)       Non-Associated(a)           0 noClear
```

The fields in the protocol display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.

Field	Description
Allocation Scope	The allocation policy for a network side signalling channel. If set to **vp**, the network side signalling channel allocates connections in its containing VP only. If set to **link**, the signalling channel allocates connections in its containing VP and may allocate connections in other VPs in the range 0 to 255 that are available to it. The **link** option is only available for UNIs on VP 0. The default is **vp** for FT-PNNI and **link** for PNNI.
Mode	The mode to be used for signalling. If set to **nonAssoc** (Non-associated signalling), the signalling channel encodes the connection identifier with Non-associated signalling bits. If set to **vpAssoc** (VP-associated signalling), the signalling channel encodes the connection identifier with the VP-associated signalling bits. The default is **nonAssoc** for FT-PNNI and **vpAssoc** for PNNI, except VP 0 which must be **nonAssoc**.
QosExpIndex	The index number of the set of QoS expansion entries. See the `QosExpIndex` field under **conf qos show** for this number. For call set-up messages that originate on this signalling channel and are routed through a PNNI network, these entries are used to perform the QoS expansion procedures. For more information, see the ATM Forum PNNI Specification. A value of `0` means that the default QoS expansion entries will be used.
CarrierLossAction	The action to be taken on this signalling channel upon sensing a carrier loss. **clearCalls** means that, upon sensing a carrier loss, the switch will immediately tear down all the connections (both those in-progress, as well as the established ones) on this signalling channel. **noClear** means that, upon sensing a carrier loss, the switch will wait for the SSCOP timers to expire before the in-progress connections on that signalling channel are torn down. The established connections on that signalling channel will take even longer to be torn down. The default is **noClear**.

To display protocol information for all of the signalling channels on a specific port and path, (for example, port 4B3 and VPI 2), enter the following parameters:

```
myswitch::configuration signalling> show 3a1 0 protocol
           Allocation
 Port VPI  Scope       Mode              QoSExpIndex CarrierLossAction
 4B3    2  VP(a)       VP-Associated(a)            0 noClear
```

The fields in this display are defined in the same manner as those in the previous example.

1.23.4.3 Displaying ATM Routing Information for Signalling Channels

To show ATM routing information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show atmroute
 Port VPI OrigCost TermCost  Domain   Node
 1A1    0      100        0       1    N/A
 1A2    0      100        0       1    N/A
 1A3    0      100        0       1    N/A
 1A4    0      100        0       1    N/A
 1A5    0      100        0       1    N/A
 1A6    0      100        0       1    N/A
 1C1    0      100        0       1    N/A
 1C2    0      100        0       1    N/A
 1C3    0      100        0       1    N/A
 1C4    0      100        0       1    N/A
 1CTL   0      100        0       1    N/A
```


The fields in the routing display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
OrigCost	The cost of each FT-PNNI link configured at the originating end of the signalling channel.
TermCost	The cost of each FT-PNNI link configured at the terminating end of the signalling channel.
Domain	The index number of the PNNI domain to which this signalling channel belongs.
Node	The node number to which this signalling channel belongs. This field only applies to PNNI interfaces.

To display ATM routing information for all of the signalling channels on a specific port and path, (for example, port 1A4 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1a4 0 atmroute
 Port VPI OrigCost TermCost  Domain   Node
 1A4    0      100        0       1    N/A
```

The fields in this display are defined in the same manner as those in the previous example.

1.23.4.4 Displaying Timer Information for Signalling Channels

To show timer information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show timers
 Port VPI SscopNoResponse
 1A1    0              10
 1A2    0              10
 1A3    0               7
 1A4    0              10
 1B1    0               7
 1B2    0              10
 1B3    0              10
 1B4    0               7
 1CTL   0              10
```

The fields in the timer display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
SScopNoResponse	The value that has been set for the duration of the SSCOP no response timer. This is the time in seconds to wait before bringing the SSCOP connection down. The default value is 10 seconds for UNI 3.0 and 7 seconds for UNI 3.1.

To display timer information for all of the signalling channels on a specific port and path, (for example, port 1A3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1A3 0 timers
 Port VPI SscopNoResponse
 1A3    0               7
```

The fields in this display are defined in the same manner as those in the previous example.

1.23.4.5 Displaying Public UNI Information for Signalling Channels

To show public UNI information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show public
                                                E164Address
 Port  VPI ILMIReg AddressFmt E164Address      Resolution      PlanType
 1B1     0 disable E.164                       enable          international
 1B2     0 disable E.164                       enable          national
 1B3     0 enable  private                     disable         unknown
 1B4     0 disable E.164                       enable          subscriber
 1CTL    0 enable  private                     disable         unknown
```


The fields in the public display are defined as follows:

Field	Description
Port	The port numbers that currently have a signalling interface enabled.
VPI	The number of the virtual path that contains the signalling channel.
ILMIReg	Shows whether ILMI address and prefix registration occur across this signalling channel. `Enable` means that ILMI address and prefix registration occur across this signalling channel. If **`enable`** is displayed, then this is not a public UNI. **`Disable`** means that no prefix registration messages are sent by the network-side, and no address registration messages are generated by the user-side. **`Ignore`** means that the network-side performs as it normally would, except that addresses registered are not published into the routing database. This setting is not recommended except in public network situations in which CPE equipment needs ILMI address registration in order to function correctly.
AddressFmt	Shows if the native `e164` (used by public UNI) address format or if the `private` address format is being used across this link.
E164 Address	Shows the native `e164` address assigned to this link.
E164 Address Resolution	Shows whether or not to resolve private NSAP addresses into native E.164 addresses. `Enable` means that NSAP address-to-E.164 address mapping occurs. `Disable` means that NSAP address-to-E.164 address mapping does not occur. However, if you use `disable`, but you are also using the native E.164 address format, then the only address conversion performed at this signalling channel is for private NSAP addresses in E.164 format.
PlanType	Shows the plan type used in the calling party number and called party number information elements in the signalling messages. By default, **`international`** is used with the **`e164`** address format. This value can be specified for **`e164`**. By default, **`unknown`** is used with the **`private`** address format. This value cannot be modified for **`private`**.

To display public information for all of the signalling channels on a specific port and path, (for example, port 1b2 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b2 0 public
                                                E164Address
 Port  VPI ILMIReg AddressFmt E164Address       Resolution      PlanType
 1B2     0 disable E.164                        enable          national
```

The fields in this display are defined in the same manner as those in the previous example.

1.23.4.6 Displaying IE Filter Information for Signalling Channels

To show IE filter (information element filter) information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show iefilter
Port  VPI  IEFilter CG CGS CDS BHLI BLLI BLLI23 AAL Default Calling Address
1A1     0  enabled  -  -   +   -    -    +      +                  enabled
                         0x47.0005.80.ffe100.9999.a0145.7623.131415161718.ee
1A2     1  disabled -  +   +   +    +    +      +                 disabled
                         0x47.0005.80.ffe100.9999.c01d.c552.131415161718.00
1B4     0  enabled  +  -   -   +    -    +      -                 disabled
                                  00000000000000000000000000000000000000000000
```

The fields in the iefilter display are defined as follows:

Field	Description
Port	The port number of the signalling channel to which the IE filters apply.
VPI	The virtual path number that contains the signalling channel to which the IE filters apply.
IEFilter	Shows whether or not the information element (IE) filter has been enabled. Filters can be applied to the following IEs: **cg**, **cgs**, **cds**, **blli**, **blli23**, **bhli**, **aal**. **enabled** means that the IEs listed with a - will not be passed to the called party (they are filtered) and the IEs listed with a + will be passed to the called party. **disabled** means that no IEs are filtered (all are passed), despite the + or -; i.e., the filtering feature is turned off.
CG	Filters on the address of the call originating entity.
CGS	Filters on the subaddress of the call originating entity.
CDS	Filters on the subaddress of the called party.
BHLI	Filters on the Broadband High Layer Information (BHLI), which provides compatibility checking by an addressed entity (e.g., a recipient of a call).

Field	Description
BLLI	Filters on all (first, second, and third) Broadband Low Layer Information (BLLI) IEs, which provides compatibility checking by an addressed entity. This information is normally transferred transparently between the call originator and the call recipient.
BLLI23	Filters on only the second and third Broadband Low Layer Information (BLLI) IEs.
AAL	Filters on the AAL (ATM Adaptation Layer) information.
Default Calling Address	**enabled** means that the default calling party number (CPN) shown in the display is inserted if one has not been provided. **disabled** means that no default CPN is inserted if one has not been provided. If a default CPN is not supplied, an incoming call setup message without a CPN is treated as if it has a CPN of all zeros.

To display iefilter information for all of the signalling channels on a specific port and path, (for example, port 1B3 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1b3 0 iefilter
 1B3     0  disabled -  +   +   +    +    +      +                   disabled
                                    00000000000000000000000000000000000000000
```

The fields in this display are defined in the same manner as those in the previous example.

1.23.4.7 Displaying NSAP Filter Information for Signalling Channels

To show NSAP filter information about all of the signalling channels on a switch fabric, enter the following parameters:

```
myswitch::configuration signalling> show nsapfilter
Port VPI  Incoming Filter ID    Outgoing Filter ID
1A1    0  21
1A2    0  625                   49
1B4    0  keep_them_out         68
1CTL   0                       42
```

The fields in the nsapfilter display are defined as follows:

Field	Description
Port	The port number of the signalling channel to which the filter applies.
VPI	The virtual path number of the signalling channel to which the filter applies.
Incoming Filter ID	The unique index number or name that identifies this incoming filter. See the Index and Name fields under **conf security nsapfilter show**.
Outgoing Filter ID	The unique index number or name that identifies this outgoing filter. See the Index and Name fields under **conf security nsapfilter show**.

To display NSAP filter information for all of the signalling channels on a specific port and path, (for example, port 1B4 and VPI 0), enter the following parameters:

```
myswitch::configuration signalling> show 1B4 0 nsapfilter
Port VPI  Incoming Filter ID    Outgoing Filter ID
1B4    0  keep_them_out         68
```

The fields in this display are defined in the same manner as those in the previous example.

1.24 Usage Parameter Control Configuration Commands

These commands let you create, delete, or display usage parameter control (UPC) traffic contracts. These contracts can then be applied to PVCs using the **conf vcc new** or the **conf vpc new** command. You can display the list of available subcommands by typing **upc ?** at the **configuration** level.

```
myswitch::configuration> upc ?
delete          new             show
```


1.24.1 Deleting a UPC Traffic Contract

This command allows you to delete an existing UPC contract. Enter the following parameters:

```
myswitch::configuration upc> delete <index>
```

1.24.2 Creating a UPC Traffic Contract

This command lets you create a UPC contract. Enter the following parameters:

```
myswitch::configuration upc> new <index> ubr [aal5 [noPktDisc]] [ubrTagging] [AltCLP]
       [-name <name>]
 OR
new <index> <UPC> [-cdvt <us>] [noGCRA] [aal5 [noPktDisc] [PPPol]]
       [AltCLP] [-scheduling (roundrobin | smoothed | guaranteed)] [-name <name>]
Where UPC is one of the following combinations of traffic parameters:
       cbr  <pcr01>
        cbr0 <pcr0>  <pcr01> [tag]
        vbr  <pcr01> <scr01> <mbs01>
        vbr0 <pcr01> <scr0>  <mbs0>  [tag]
```

The parameters for delete and new are defined as follows:

Parameter	Description
index	The integer index that refers to this specific traffic contract. Valid index numbers are from 0 to 32,767.
UPC	One of the types of traffic contracts shown above. The parameters in these contracts are defined as follows:
ubr	Indicates UBR traffic.

Parameter	Description
cbr[1]	Indicates CBR traffic.
cbr0	Indicates CBR0 traffic.
vbr	Indicates VBR traffic.
vbr0	Indicates VBR0 traffic.
pcr0	Indicates the peak cell rate for cells with CLP = 0.
pcr01	Indicates the peak cell rate for all cells.
scr0	Indicates the sustainable cell rate for cells with CLP = 0.
scr01	Indicates the sustainable cell rate for all cells.
mbs0	Indicates the maximum burst size for cells with CLP = 0.
mbs01	Indicates the maximum burst size for all cells.
tag	**tag** means that non-conforming CLP = 0 cells are tagged. Otherwise, they are dropped. The default is that they are dropped. This option only applies to the PCR0 parameter of the CBR0 contract and to the SCR0 and MBS0 parameters of the VBR0 contract.
-cdvt us	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in microseconds. If the CDVT is not specified here, the default CDVT value associated with the port will be used. (See **conf port show** and **conf port cdvt** for more information).
noGCRA	**noGCRA** means that GCRA policing is disabled on CBR or VBR (depending on what is configured) connections using this contract. If **noGCRA** is not entered, then GCRA policing is enabled on CBR or VBR (depending on what is configured) connections using this contract. By default, **noGCRA** is not entered (GCRA policing is enabled). You must use the **noGCRA** option when applying a UPC contract to the outbound signalling channel using the **-outsigupc** *<upc-index>* variable under **conf signalling new** to prevent the outbound signalling channel from being policed.
aal5	The connection is using the AAL5 Adaptation Layer.
noPktDisc	This optional parameter can only be used if the connection is AAL5 (i.e., the **aal5** parameter is present). This parameter suppresses EPD / PPD (AAL5 packet discard) on the connection. The default is for this parameter not to be present (EPD / PPD is enabled).
ubrTagging	**ubrTagging** means that all UBR traffic is tagged (set to CLP=1) on this connection. If **ubrTagging** is not entered, then UBR traffic is not tagged on this connection. This command only applies to UBR traffic. By default, UBR traffic is not tagged.
PPPol[2]	The optional parameter can only be used if the connection is AAL5 (i.e., the **aal5** parameter is present). This parameter indicates that Partial Packet Policing is going to be performed on this connection. The default is for this parameter not to be present, which leaves Partial Packet Policing disabled.
AltCLP	This optional parameter only applies to connections on Series D network modules. It indicates that the alternate CLP threshold (configured using **conf module traffic d altclpthresh**) should be used for all connections created with this UPC contract. The default is for this parameter not to be present, which means the connections will not use the alternate CLP threshold.

Parameter	Description
-scheduling (roundrobin | smoothed | guaranteed)[3]	Indicates the scheduling mode to be used for servicing traffic on the output side of a Series D network module. **roundrobin** means that all service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs. **smoothed** means that all service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second. **guaranteed** is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.
-name <name>	The user-defined name associated with this UPC traffic contract. This helps you remember for what traffic type this specific contract is used. If you do not specify a name, a default name that relates to this type of traffic contract is assigned automatically.

1. The units for **pcr0**, **pcr01**, **scr0**, **scr01**, **mbs0**, and **mbs01** are specified either in cells per second or in kilobits per second, depending on what you used for **conf system units**. To display the current setting, use **conf system show**. The default is **cps** (cells per second).
2. The HDCOMP ASIC must be version 1 or greater to support AAL5 partial packet policing. To display the ASIC version, use the **conf board show advanced** command.
3. The **-scheduling** option has an effect only on connections with outputs on Series D network modules. All other network module platforms only use **roundrobin** scheduling.

The following is an example of how to create a UPC contract:

```
myswitch::configuration upc> new 5 vbr0 500 200 250 -cdvt 1000 aal5 PPPol -name vbr0_upc
```

This example specifies a contract named "vbr0_upc", which is a VBR0 contract with an index of 5, a pcr01 of 500 cells/sec (or kbps), an scr0 of 200 cells/sec (or kbps), an mbs0 of 250 cells (or kilobits), a CDVT of 1,000 microseconds, and partial packet policing enabled.

For more information about traffic contracts, please refer to Table 5-7 in the ATM Forum UNI 3.0 Specification.

PVCs that use UPC contracts that contain any of the [noGCRA], [aal5 [noPktDisc] [PPPol]], and [ubrTagging] parameters are valid only when the **conf port gcrapolicing**, **conf port aal5packetdiscard**, **conf port pppolicing**, and **conf port ubrtagging** parameters are set to svcOn or svcOff. Use **conf port show tm** to check these settings.

1.24.3 Displaying the UPC Traffic Contracts

This command lets you display all of the UPC contracts. Enter the following parameters:

```
myswitch::configuration upc> show
 Index  PCR01  SCR01  MBS01   PCR0   SCR0   MBS0   CDVT TAG Name
 0                                                      default_ubr
```

The fields in this display are defined as follows:

Field	Description
Index	The UPC contracts listed by index number.
PCR01[1]	The peak cell rate for all cells for this contract.
SCR01	The sustainable cell rate for all cells in this contract.
MBS01	The maximum burst size for all cells in this contract.
PCR0	The peak cell rate for cells with CLP=0 for this contract.
SCR0	The sustainable cell rate for cells with CLP=0 for this contract.
MBS0	The maximum burst size for cells with CLP=0 for this contract.
CDVT	The Cell Delay Variation Tolerance (CDVT) associated with the peak cell rates, in micro-seconds.
TAG	**Tag** means that non-compliant CLP=0 cells are tagged. No entry means that non-compliant cells are dropped. This option only applies to cells measured by the PCR0 parameter of the CBR0 contract and to cells measured by the SCR0 and MBS0 parameters of the VBR0 contract.
Name	The user-defined name associated with this UPC traffic contract.

1. The units for PCR01, SCR01, MBS01, PCR0, SCR0, and MBS0 are shown either in cps or in kbps, depending on what you used for **conf system units**. To display the current setting, use **conf system show**. The default is **cps**.

This command also lets you display all of the traffic management flags for the UPC contracts. Enter the following parameters:

```
myswitch::configuration upc> show [<index>] [flags]
myswitch::configuration upc> show flags
 Index GCRApol PPpol AAL5 PktDisc UBRtag AltCLP Scheduling Name
 0                                              roundrobin default_ubr
```

The fields in this display are defined as follows:

Field	Description
Index	The UPC contracts listed by index number.
GCRApol	**GCRApol** means that GCRA policing is enabled on connections that use this contract. If **GCRApol** is not displayed, then GCRA policing is disabled on all connections that use this contract.
PPpol	**PPpol** means that partial packet policing is enabled on connections that use this contract. If **PPpol** is not displayed, then partial packet policing is disabled on all connections that use this contract.
AAL5	**AAL5** means that this is an AAL5 connection. If **AAL5** is not displayed, then this is not an AAL5 connection.
PktDisc	**PktDisc** means that packet discard is enabled on connections that use this contract. If **PktDisc** is not displayed, then packet discard is disabled on all connections that use this contract.
UBRtag	**UBRtag** means that all UBR traffic is tagged (set to CLP=1) as non-compliant on connections that use this contract. If **UBRtag** is not displayed, then UBR traffic is not tagged on connections that use this contract.
AltCLP	This field only applies to connections on Series D network modules. It indicates that the alternate CLP threshold (configured using **conf module traffic d altclpthresh**) should be used for all connections created with this UPC contract. The default is for the connections not to use the alternate CLP threshold.
Scheduling	The scheduling mode that dictates the way traffic is serviced on the output side of a Series D network module. **roundrobin** means that all service for these connections comes from one of the round-robin queues in the network module. This is the default mode for both SVCs and PVCs. **smoothed** means that all service for these connections comes from the network module's rate controller, which ensures that cells for these connections are transmitted into the network at a fixed rate of R cells per second. **guaranteed** is a combination of the round-robin and smoothed modes. Service for these connections are scheduled with both fixed rate R from the rate controller, and they have an entry in the appropriate round-robin queue.
Name	The user-defined name associated with this UPC traffic contract.

1.25 Virtual Channel Configuration Commands

These commands let you configure permanent virtual channels (PVCs). You can display the list of available subcommands by typing **vcc ?** at the **configuration** level.

```
myswitch::configuration> vcc ?
  delete           new              show
```

1.25.1 Deleting a Virtual Channel

This command allows you to delete an existing permanent virtual channel. Enter the following parameters:

```
myswitch::configuration vcc> delete <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>
```

1.25.2 Creating a Virtual Channel

This command enables you to add a new permanent virtual channel. Enter the following parameters:

```
myswitch::configuration vcc> new <iport> <ivpi> <ivci> <oport> <ovpi> <ovci>\
[-upc <index>] [-name <name>]
advanced options:
    [-inctype (orig | tran | term) -outctype (orig | tran | term) [pmp|mpp|mpmp]]
```

The parameters for delete and new are defined as follows:

Parameter	Description
iport	The incoming port number.
ivpi	The incoming virtual path number.
ivci	The incoming virtual channel number.
oport	The outgoing port number.
ovpi	The outgoing virtual path number.
ovci	The outgoing virtual channel number.

Parameter	Description
-upc <index>	The integer index that refers to a specific UPC traffic contract. If no index is specified, then no traffic policing will take place on this VCI. It is assigned a UPC index of 0, and all traffic on this VCI is treated as UBR traffic. This is the default.
name	The name you want to assign to this channel to identify it uniquely. It is useful for billing purposes so you can identify which channels are being used by which customers. Can be up to 32 ASCII characters long.
inctype	The channel connection type for the incoming channel. For billing purposes, it denotes on which switch this channel is arriving. **Orig** (originating) means that the ingress endpoint of the channel is connected to the source node which is outside the network, **tran** (transit) means that the ingress endpoint of the channel is connected to a node within the network, and **term** (terminating) means that the ingress endpoint of the channel is connected to the destination node which is outside the network.
outctype	The channel connection type for the outgoing channel. For billing purposes, it denotes on which switch this channel is leaving. **Orig** (originating) means that the egress endpoint of the channel is connected to the source node which is outside the network, **tran** (transit) means that the egress endpoint of the channel is connected to a node within the network, and **term** (terminating) means that the egress endpoint of the channel is connected to the destination node which is outside the network.
pmp[1]	Indicates this is a point-to-multipoint channel.
mpp	Indicates this is a multipoint-to-point channel.
mpmp	Indicates this is a multipoint-to-multipoint channel.

1. By indicating pmp, mpp, or mpmp, you are only assigning a label for record keeping purposes. The switch does not necessarily create the type of channel you have specified. If you assign a connection type, but do not assign a pmp, mpp, or mpmp label, the switch assigns a label of pp (point-to-point).

The following is an example of how to create a virtual channel which specifies the connection type:

```
myswitch::configuration vcc> new 3b1 0 100 3b4 0 100 -inctype tran -outctype tran
```

The following is an example of how to create a virtual channel which has a name assigned to it:

```
myswitch::configuration vcc> new 3b2 0 145 3b3 0 145 -name customer_a
```

The following is an example of how to create a simple virtual channel on an ASX-1000 or TNX-1100. To create a vcc going in port 2A1, vpi 0, vci 100 on the switch board installed in slot 2 and going out port 4B1, vpi 0, vci 100 on the switch board installed in slot 4, enter the following:

```
myswitch::configuration vcc> new 2a1 0 100 2e4 0 100
myswitch::configuration vcc> new 2e4 0 100 2a1 0 100

myswitch::configuration vcc> new 4b1 0 100 4e2 0 100
myswitch::configuration vcc> new 4e2 0 100 4b1 0 100
```

In the first line in the first pair, notice that the output port is 2E4. This is the intra-fabric port. The 2 means the connection is coming out of the switch board in slot 2 through the intra-fabric port. The E represents the intra-fabric port. The 4 means the connection is destined for switch board in slot 4. 2E4 then becomes the input port in the second line.

In the first line in the second pair, notice that the output port is 4E2. This is the intra-fabric port. The 4 means the connection is coming out of the switch board in slot 4 through the intra-fabric port. The E represents the intra-fabric port. The 2 means the connection is destined for switch board in slot 2. 4E2 then becomes the input port in the second line.

1.25.3 Displaying the Virtual Channel Configuration

This command allows you to display existing virtual channels. You can display either all of the existing virtual channels on an individual switch fabric or all of the existing virtual channels on a specific port. To list all of the existing permanent virtual channels on an individual switch fabric, enter the following parameters:

```
myswitch::configuration vcc> show
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0    5  3CTL    0   49    0  uni       N/A
 3B1     0   14  3CTL    0   48    0  spans     N/A
 3B1     0   15  3CTL    0   47       spans     N/A
 3B1     0   16  3CTL    0   50       uni       N/A
 3B1     0  100  3B4     0  100    0  pvc       N/A
 3B2     0    5  3CTL    0   53    0  uni       N/A
 3B2     0   14  3CTL    0   52    0  spans     N/A
 3B2     0   15  3CTL    0   51       spans     N/A
 3B2     0   16  3CTL    0   54       uni       N/A
 3B2     0  145  3B3     0  145    0  pvc       customer_a
 3B3     0    5  3CTL    0   57    0  uni       N/A
Press return for more, q to quit: q
```

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the virtual channel.
Input VPI	The incoming virtual path number.
Input VCI	The incoming virtual channel number.
Output Port	The outgoing port number of the virtual channel.
Output VPI	The outgoing virtual path number.
Output VCI	The outgoing virtual channel number.
UPC	The integer index that refers to the specific UPC traffic contract assigned to this VCI.
Protocol	The type of protocol is running on this channel, which can be `spans`, `pvc`, `uni` or `spvc`.
Name	The unique, user-assigned name for this channel. If no name is assigned, shows `N/A`.

To list all of the existing permanent virtual channels on a specific port, (for example, port 3B1), enter the following parameters:

```
myswitch::configuration vcc> show 3B1
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0    5  3CTL    0   49    0  uni       N/A
 3B1     0   14  3CTL    0   48    0  spans     N/A
 3B1     0   15  3CTL    0   47       spans     N/A
 3B1     0   16  3CTL    0   50       uni       N/A
 3B1     0  100  3B4     0  100    0  pvc       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list all of the existing permanent virtual channels on a specific port and path, (for example, port 3B1 and VPI 0), enter the following parameters:

```
myswitch::configuration vcc> show 3b1 0
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0    5  3CTL    0   49    0  uni       N/A
 3B1     0   14  3CTL    0   48    0  spans     N/A
 3B1     0   15  3CTL    0   47       spans     N/A
 3B1     0   16  3CTL    0   50       uni       N/A
 3B1     0  100  3B4     0  100    0  pvc       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list all of the existing permanent virtual channels on a specific port, path, and channel (for example, port 3B1, VPI 0, and VCI 100), enter the following parameters:

```
myswitch::configuration vcc> show 3B1 0 100
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  UPC  Protocol  Name
 3B1     0  100  3B4     0  100    0  pvc       N/A
```

The fields in this display are defined in the same manner as those in the previous example.

To list advanced information about all of the existing permanent virtual channels on a switch board, enter the following parameters:

```
myswitch::configuration vcc> show advanced
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  Protocol  ConType
 3B1     0    5  3CTL    0   49  uni       N/A
 3B1     0   14  3CTL    0   48  spans     N/A
 3B1     0   15  3CTL    0   47  spans     N/A
 3B1     0   16  3CTL    0   50  uni       N/A
 3B1     0  100  3B4     0  100  pvc       tran-tran-pp
 3B2     0    5  3CTL    0   53  uni       N/A
 3B2     0   14  3CTL    0   52  spans     N/A
 3B2     0   15  3CTL    0   51  spans     N/A
 3B2     0   16  3CTL    0   54  uni       N/A
Press return for more, q to quit: q
```


The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the virtual channel.
Input VPI	The incoming virtual path number.
Input VCI	The incoming virtual channel number.
Output Port	The outgoing port number of the virtual channel.
Output VPI	The outgoing virtual path number.
Output VCI	The outgoing virtual channel number.
Protocol	The type of protocol running on this channel, which can be `spans`, `pvc`, `uni` or `spvc`.
ConType	The connection type for the endpoints of this channel with respect to a particular network. **`Orig`** (originating) means that the ingress/egress endpoint of the channel is connected to the source node which is outside the network, **`tran`** (transit) means that the ingress/egress endpoint of the channel is connected to a node within the network, and **`term`** (terminating) means that the ingress/egress endpoint of the channel is connected to the destination node which is outside the network. **`pp`** means this is labelled as a point-to-point channel, **`pmp`** means this is labelled as a point-to-multipoint channel, **`mpp`** means this is labelled as a multipoint-to-point channel. **`mpmp`** means this is labelled as a multipoint-to-multipoint channel.

To list advanced information about all of the existing permanent virtual channels on a specific port, (e.g., port 3B1), enter the following parameters:

```
myswitch::configuration vcc> show 3b1 advanced
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI  Protocol  ConType
 3B1     0    5  3CTL    0   49  uni       N/A
 3B1     0   14  3CTL    0   48  spans     N/A
 3B1     0   15  3CTL    0   47  spans     N/A
 3B1     0   16  3CTL    0   50  uni       N/A
 3B1     0  100  3B4     0  100  pvc       tran-tran-pp
```

The fields in this display are defined in the same manner as those in the previous example.

To list all of the existing permanent virtual channels on a specific port, path, and channel (e.g., port 3B1, VPI 0, and VCI 100), enter the following parameters:

```
myswitch::configuration vcc> show 3B1 0 100 advanced
 Input        Output
 Port  VPI  VCI  Port  VPI  VCI Protocol  ConType
 3B1     0  100  3B4     0  100  pvc       tran-tran-pp
```

The fields in this display are defined in the same manner as those in the previous example.

1.26 Virtual Path Configuration Commands

These commands let you configure virtual paths. You can display the list of available subcommands by typing **vpc ?** at the **configuration** level.

In *ForeThought* 4.1 and greater, these commands are only used to configure through paths. To configure originating or terminating paths you must use the **conf vpt** commands.

```
myswitch::configuration> vpc ?
  delete          new             show
```


1.26.1 Deleting a Virtual Path

This command lets you delete an existing virtual (through) path. Enter the following:

```
myswitch::configuration vpc> delete <iport> <ivpi> <oport> <ovpi>
```

1.26.2 Creating a Virtual Path

This command lets you add a virtual (through) path. There are advanced options which may be used in combination with the required parameters. Enter the following:

```
myswitch::configura vpc> new <iport> <ivpi> <oport> <ovpi> [-upc <index>] [-name <name>]
advanced options:
    [-inctype (orig|tran|term) -outctype (orig|tran|term) [pmp|mpp|mpmp]]\
    [-shapeivpi <vpi>]
```

The parameters for delete and new are defined as follows:

Parameter	Description
iport	The incoming port number.
ivpi	The incoming virtual path number.[1]
oport	The outgoing port number.
ovpi	The outgoing virtual path number.

Parameter	Description
-upc <index>	The integer index that refers to a specific UPC traffic contract. If no index is specified, then no traffic policing will take place on this VPI. It is assigned a UPC index of 0, and all traffic on this VPI is treated as UBR traffic. This is the default.
-name <name>	The name you want to assign to this through path to help identify it uniquely. It is most useful for billing purposes so you can identify which paths are being used by which customers. Can be up to 32 ASCII characters long.
-inctype (orig | tran |term)	The path connection type for the incoming path. For billing purposes, it denotes on which switch this path is arriving. **Orig** (originating) means that the ingress endpoint of the path is connected to the source node which is outside the network, **tran** (transit) means that the ingress endpoint of the path is connected to a node within the network, and **term** (terminating) means that the ingress endpoint of the path is connected to the destination node which is outside the network.
-outctype(orig | tran |term)	The path connection type for the outgoing path. For billing purposes, it denotes on which switch this path is leaving. **Orig** (originating) means that the egress endpoint of the path is connected to the source node which is outside the network, **tran** (transit) means that the egress endpoint of the path is connected to a node within the network, and **term** (terminating) means that the egress endpoint of the path is connected to the destination node which is outside the network.
pmp[2]	Indicates this is a point-to-multipoint path.
mpp	Indicates this is a multipoint-to-point path.
mpmp	Indicates this is a multipoint-to-multipoint path.
-shapeivpi <vpi>[3]	The incoming VPI for this through path. When the traffic shaping port is not the port connected to the WAN, a through path must be created from the WAN port to the traffic shaping port. Cells arrive from the network at the traffic shaping port with this value equal to the VPI of the terminating path at the traffic shaping port.

1. The valid range of incoming and outgoing VPIs is 0 - 1022 (1023 is used for multicast). However, Series D E3 and DS3 network modules can only use VPIs 0 - 510 (511 is used for multicast).
2. By indicating **pmp**, **mpp**, or **mpmp**, you are only assigning a label for record keeping purposes. The switch does not necessarily create the type of path you have specified. If you assign a connection type, but do not assign a **pmp**, **mpp**, or **mpmp** label, the switch assigns a label of **pp** (point-to-point).
3. If you want to shape traffic on more than two ports on a given network module, it is recommended that you set the traffic memory model to model number 5 for that network module. Please see the sections, Displaying Traffic Models for a Network Module, and, Setting Traffic Models on a Network Module, found earlier in this chapter for information about how to do this.

The following is an example of how to create a virtual path which specifies a name:

```
myswitch::configuration vpc> new 3b1 75 3b5 75 -name customer_b
```

The following is an example of how to create a virtual path which specifies a name and a connection type:

```
myswitch::configura vpc> new 3b6 62 3b2 62 -name customer_c -inctype tran - outctype tran
```


Terminating and originating paths cannot be created across the intra-fabric ports on an ASX-1000 or TNX-1100; only through paths can be created across the intra-fabric ports as shown in the following example.

The following is an example of how to create a simple virtual path on an ASX-1000 or TNX-1100. To create a through path going in port 2A1, vpi 1 on the switch board installed in slot 2 and going out port 4B1, vpi 1 on the switch board installed in slot 4, enter the following:

```
myswitch::configuration vpc> new 2a1 1 2e4 1
myswitch::configuration vpc> new 2e4 1 2a1 1

myswitch::configuration vpc> new 4b1 1 4e2 1
myswitch::configuration vpc> new 4e2 1 4b1 1
```

In the first line in the first pair, notice that the output port is 2E4. This is the intra-fabric port. The 2 means the connection is coming out of the switch board in slot 2 through the intra-fabric port. The E represents the intra-fabric port. The 4 means the connection is destined for switch board in slot 4. 2E4 then becomes the input port in the second line.

In the first line in the second pair, notice that the output port is 4E2. This is the intra-fabric port. The 4 means the connection is coming out of the switch board in slot 4 through the intra-fabric port. The E represents the intra-fabric port. The 2 means the connection is destined for switch board in slot 2. 4E2 then becomes the input port in the second line.

Through paths cannot use VPI 0 on the intra-fabric port connections on an ASX-1000 or TNX-1100.

1.26.3 Displaying Virtual Paths

This command lets you display existing virtual (through) paths. You can show either all of the existing virtual paths on an individual switch fabric or all of the existing virtual paths on a specific port. Enter the following parameters:

```
myswitch::configuration vpc> show
Input      Output
Port  VPI  Port  VPI  UPC  Prot  Name
3B1    40  3B4    40    0  pvc   customer_a
3B1    75  3B5    75    0  pvc   customer_b
3B2    95  3B3    95    0  pvc   customer_e
3B6    62  3B2    62    0  pvc   customer_c
3B6    68  3B3    68    0  pvc   customer_d
```

The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the through path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the through path.
Output VPI	The outgoing virtual path number.
UPC	The integer index that refers to a specific traffic contract assigned to this through path. UPC contracts can be displayed using **conf upc show**.
Prot	The type of protocol running on this channel.
Name	The user-assigned name which helps to identify this through path uniquely.

To list advanced options about all of the existing virtual (through) paths, enter the following parameters:

```
myswitch::configuration vpc> show advanced
 Input      Output
 Port  VPI  Port  VPI  Shape  ConType
 3B1    40  3B4    40         N/A
 3B1    75  3B5    75         N/A
 3B2    95  3B3    95         tran-tran-pmp
 3B6    62  3B2    62         tran-tran-pp
 3B6    68  3B3    68         N/A
```


The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the through path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the through path.
Output VPI	The outgoing virtual path number.
Shape	Indicates whether or not traffic shaping has been enabled for this path.
ConType	The connection type for the endpoints of this path with respect to a particular network. **Orig** (originating) means that the ingress/egress endpoint of the path is connected to the source node which is outside the network, **tran** (transit) means that the ingress/egress endpoint of the path is connected to a node within the network, and **term** (terminating) means that the ingress/egress endpoint of the path is connected to the destination node which is outside the network. **pp** means this is labelled as a point-to-point path, **pmp** means this is labelled as a point-to-multipoint path, **mpp** means this is labelled as a multi-point-to-point path. **mpmp** means this is labelled as a multipoint-to-multipoint path.

If you have not configured any virtual (through) paths, then the following is displayed:

```
myswitch::configuration vpc> show
No virtual path information is available
```

1.27 Virtual Path Terminator Configuration Commands

These commands let you configure virtual path terminators. You can display the list of available subcommands by typing **vpt ?** at the **configuration** level.

These commands are only used to configure originating or terminating paths. To configure through paths, you must use the **conf vpc** commands.

```
myswitch::configuration> vpt ?
  delete          modify          new             show
```

1.27.1 Deleting a Virtual Path Terminator

This command lets you delete a virtual path terminator. Enter the following parameters:

```
myswitch::configuration vpt> delete <port> <vpi> [(term | orig)]
```

Virtual Path 0 cannot be deleted on any of the connections to the intra-fabric ports on an ASX-1000 or TNX-1100. Virtual Path 0 cannot be deleted on the control port (CTL) on any switch.

The following is an example of how to delete a terminating path:

```
myswitch::configuration vpt> del 3b4 88 term
Would you like to delete the originating side also [y]? y
```

The following is an example of how to delete an originating path:

```
myswitch::configuration vpt> del 3b3 99 orig
Would you like to delete the terminating side also [y]? y
```

If you do not specify **term** or **orig**, the switch automatically deletes both sides of the path:

```
myswitch::configuration vpt> del 3b4 88
```

Before deleting a virtual path, you must first delete all VCCs which use that path.

1.27.2 Modifying a Virtual Path Terminator

This command lets you modify an existing virtual path terminator. Enter the following parameters:

```
myswitch::configuration vpt> modify <port> <vpi> [(term|orig)] -reserved <Kbps>
        [-cbr (none | default | <QoSExtIndex>)]
        [-rtvbr (none | default | <QoSExtIndex>)]
        [-nrtvbr (none | default | <QoSExtIndex>)]
        [-ubr (none | default | <QoSExtIndex>)]
        [-abr (none | default | <QoSExtIndex>)]
```


1.27.3 Creating a Virtual Path Terminator

This command lets you create a new virtual path terminator. Enter the following parameters:

```
myswitch::configuration vpt> new <port> <vpi> [(term | orig)] [-reserved <Kbs>] \
        [-minvci <vci>] [-maxvci <vci>]
advanced options for orig paths:
        [-shapeovpi <vpi>] [-vbrob <percent>] [-vbrbuffob <percent>]
extended qos options for orig/term paths:
        [-cbr (none | default | <QoSExtIndex>]
        [-rtvbr (none | default | <QoSExtIndex>)]
        [-nrtvbr (none | default | <QoSExtIndex>)]
        [-ubr (none | default | <QoSExtIndex>)]
        [-abr (none | default | <QoSExtIndex>)]
```

The following is an example of how to create a terminating path:

```
myswitch::configuration vpt> new 3b3 99 term
Would you like to create the originating side also [y]? y
```

The following is an example of how to create a originating path:

```
myswitch::configuration vpt> new 3b4 88 orig
Would you like to create the terminating side also [y]? y
```

If you do not specify **term** or **orig**, the switch automatically creates both sides of the path:

```
myswitch::configuration vpt> new 3b4 88
```

The parameters for new, modify, and delete are defined as follows:

Parameter	Description
port	The port number for this vpt.
vpi	The path number for this vpt.[1]
term	Specifies that the vpt to be created is a terminating path. If this option is not used, an elastic path is created. Elastic paths allocate and de-allocate bandwidth for their channels from the link.
orig	Specifies that the vpt to be created is an originating path.
reserved	The amount of bandwidth, in Kbps, that you want to reserve on this vpt.
minvci	The bottom number for the range of VCIs to be reserved for VCCs on this vpt. The default is **1**.
maxvci	The top number for the range of VCIs to be reserved for VCCs on this vpt. The default is **511**.
shapeovpi	The output port of a traffic shaping originating vpt. Setting this value configures traffic shaping on the originating path. Cells bound for the network leave the traffic shaping port with this VPI. When the traffic shaping port is the WAN port, this value equals the input VPI of the originating path. If the traffic shaping port is not the WAN port, this value equals the input VPI of the through path from the shaping port to the WAN port.
vbrob	The bandwidth overbooking level for this vpt, specified as a percentage. Valid values are integers from 1 to 32,767. **100** means that no overbooking has been defined. Values less than **100** cause underbooking. Values greater than **100** cause overbooking. Overbooking cannot be specified on an elastic path. Therefore, you can only specify an overbooking factor for an originating path when you also have reserved bandwidth for the path (i.e., specified the **-reserved** <*Kbs*> parameter).
vbrbuffob	The buffer overbooking level for this vpt, specified as a percentage. Valid values are integers greater than or equal to 1. **100** means that no overbooking has been defined. Values less than **100** cause underbooking. Values greater than **100** cause overbooking. Overbooking cannot be specified on an elastic path. Therefore, you can only specify an overbooking factor for an originating path when you also have reserved bandwidth for the path (i.e., specified the **-reserved** <*Kbs*> parameter).
none	The specified class of service (CBR, real-time VBR, non real-time VBR, UBR, or ABR) is not supported.
default	The default parameters of 0 CTD, 0 CDV, and 0 CLR are to be used for the CBR class of service.
QoSExtIndex	The index number of the set of QoS extension parameters. See the `QoSExtIndex` field under **conf qosext show** for this number. The `QoSExtIndex` must exist before it can be applied to a vpt.

1. The valid range of VPIs is 0 - 1022 (1023 is used for multicast). However, Series D E3 and DS3 network modules can only use VPIs 0 - 510 (511 is used for multicast).

1.27.4 Displaying Virtual Path Terminators

This command lets you display virtual path terminators for all of the ports on a switch board. Enter the following parameters:

```
myswitch::configuration vpt> show
 Input       Output
 Port  VPI   Port   VPI    ResBW  CurBW MinVCI MaxVCI  VCs  Protocol
 1C1     0   terminate      N/A   0.8K      1    511    6  pvc
 1C2     0   terminate      N/A   0.8K      1    511    7  pvc
 1C3     0   terminate      N/A   0.8K      1    511    6  pvc
 1C4     0   terminate      N/A   0.8K      1    511    5  pvc
 1CTL    0   terminate      N/A   0.0K      1   1023   19  pvc
 originate  1C1      0      N/A   0.8K      1    511    6  pvc
 originate  1C2      0      N/A   0.8K      1    511    7  pvc
 originate  1C3      0      N/A   0.8K      1    511    6  pvc
 originate  1C4      0      N/A   0.8K      1    511    5  pvc
 originate  1CTL     0      N/A   0.0K      1   1023   22  pvc
```


The fields in this display are defined as follows:

Field	Description
Input Port	The incoming port number of the vpt. Shows **originate** if it is an originating path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the vpt. Shows the number of the output port of the vpt. Shows **terminate** if it is a terminating path.
Output VPI	The outgoing virtual path number.
ResBW	The maximum amount of bandwidth, in Kbps, that is reserved for the virtual channels using this vpt. A value of **N/A** indicates that this path is an elastic path. Elastic paths allocate and de-allocate bandwidth for their channels from the link.
CurBW	The amount of bandwidth, in Kbps, that is being used by the virtual channels using this vpt.
MinVCI	The bottom number for the range of VCIs that are reserved for VCCs on this virtual path terminator. The default is **1**.
MaxVCI	The top number for the range of VCIs that are reserved for VCCs on this virtual path terminator. The default is **511**.
VCs	The number of virtual channels that are currently using this vpt.
Protocol	The type of protocol running on this channel.

1.27.4.1 Displaying Advanced VPT Information

You can also display advanced or QoS extension parameter information about VPTs.

```
myswitch::configuration vpt> show [<port> [<vpi>]] [advanced] [qosext]
```

To list all of the advanced options about all of the existing virtual path terminators, enter the following parameters:

```
myswitch::configuration vpt> show advanced
 Input      Output
 Port  VPI  Port  VPI  Shape VBROB BuffOB
 1C1     0  terminate    N/A   N/A    N/A
 1C2     0  terminate    N/A   N/A    N/A
 1C3     0  terminate    N/A   N/A    N/A
 1C4     0  terminate    N/A   N/A    N/A
 1CTL    0  terminate    N/A   N/A    N/A
 originate  1C1     0         port   port
 originate  1C2     0         port   port
 originate  1C3     0         port   port
 originate  1C4     0         port   port
 originate  1CTL    0          N/A    N/A
```

The fields in the advanced display are defined as follows:

Field	Description
Input Port	The incoming port number of the vpt. Shows **originate** if it is an originating path.
Input VPI	The incoming virtual path number.
Output Port	The outgoing port number of the vpt. Shows **terminate** if it is a terminating path.
Output VPI	The outgoing virtual path number.
Shape	Indicates whether or not traffic shaping has been enabled for this originating vpt.
VBROB	The bandwidth overbooking level assigned to this vpt, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. port means this is an elastic path. Since elastic paths derive their overbooking factors from their parent ports, use **conf port show** to display the overbooking value.
BuffOB	The buffer overbooking level assigned to this vpt, specified as a percentage. The default is 100, which means that no overbooking has been defined. Values less than 100 cause underbooking. Values greater than 100 denote overbooking. port means this is an elastic path. Since elastic paths derive their overbooking factors from their parent ports, use **conf port show** to display the overbooking value.

1.27.4.2 Displaying QoS Extension Information for VPTs

To display QoS extension parameter information about VPTs, enter the following parameters:

```
myswitch::configuration vpt> show qosext
 Type Port  VPI     Cbr    RtVbr  NrtVbr     Abr     Ubr
 term 1C1     0       1        1       1       9       9
 term 1C3     0       5        5       5       9       9
 term 1C4     0       3        3       3       9       9
 orig 1C1     0       1        1       1       1       1
 orig 1C3     0       4        4       4       4       4
 orig 1C4     0       2        2       2       2       2
```

The fields in the qosext display are defined as follows:

Field	Description
Type	Shows if this is an originating or a terminating path.
Port	The port number.
VPI	The virtual path number.
Cbr	Shows the path QoS metric information for CBR service.
RtVbr	Shows the path QoS metric information for RtVBR service.
NrtVbr	Shows the path QoS metric information for NrtVBR service.
Abr	Shows the path QoS metric information for ABR service.
Ubr	Shows the path QoS metric information for UBR service.

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