

EMC Enterprise Storage

**Departmental Switch
Models DS-16B and DS-8B
Web Tools
Version 2.3**

USER GUIDE
P/N 069001083-00

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Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

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This guide describes Web Tools and provides installation instructions as well as detailed information for using each function.

Audience

This guide is part of the Department Switch Models DS-16B and DS-8B documentation set, and is intended for use by Customer Engineers and Switch Administrators.

Organization

Here is an overview of where information is located in this guide.

This *Preface* provides information on related publications, getting help, and getting software updates.

Chapter 1, *Introducing Web Tools*, provides an overview of Web Tools and a summary of the information available through Web Tools.

Chapter 2, *Installing Web Tools*, describes the system requirements and instructions for installing and launching Web Tools.

Chapter 3, *Using Web Tools*, provides information about and instructions for using each of the windows in Web Tools.

Chapter 4, *Administrative Interface*, provides information about and instructions for using each of the windows in Web Tools.

Appendix A, *Customer Support*, provides essential questions that a customer should be prepared to answer when contacting the EMC Customer Support Center.

The *Glossary* provides a glossary of related terms used with switches.

Related Publications

Other publications that provide related information are:

- ◆ *Departmental Switch Models DS-16B and DS-8B Fabric OS version 2.2*, P/N 069001028
- ◆ *Departmental Switch Model DS-16B QuickLoop version 2.2 Reference Manual*, P/N 069001027-01

Conventions Used in this Manual

EMC uses the following conventions for notes, cautions, warnings, and danger notices.

A note presents information that is important, but not hazard-related.

**CAUTION**

A caution contains information essential to avoid damage to the system or equipment. The caution may apply to hardware or software.

**WARNING**

A warning contains information essential to avoid a hazard that can cause severe personal injury, death, or substantial property damage if you ignore the warning.

**DANGER**

A danger notice contains information essential to avoid a hazard that will cause severe personal injury, death, or substantial property damage if you ignore the warning.

EMC uses the following type style conventions in this guide:

Palatino, bold	<ul style="list-style-type: none"> ◆ Dialog box, button, icon, and menu items in text ◆ Selections you can make from the user interface, including buttons, icons, options, and field names
-----------------------	---

<i>Palatino, italic</i>	<ul style="list-style-type: none"> ◆ New terms or unique word usage in text ◆ Command line arguments when used in text ◆ Book titles
-------------------------	---

Courier, italic Arguments used in examples of command line syntax.

Courier System prompts and displays and specific filenames or complete paths. For example:
 working root directory [/user/emc]:
 c:\Program Files\EMC\Symapi\db

Courier, bold User entry. For example:
 symmpoll -p

Where to Get Help

Obtain technical support by calling your local sales office.

For service, call:

United States: (800) 782-4362 (SVC-4EMC)

Canada: (800) 543-4782 (543-4SVC)

Worldwide: (508) 497-7901

and ask for Customer Support.

Your Comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Please send a message to techpub_comments@emc.com with your opinions of this guide.

Introducing Web Tools

-
- ◆ Overview 1-2
 - ◆ Web Tools Views..... 1-3

Overview

Web Tools provides a graphical interface that enables you to monitor and manage entire fabrics and individual switches and ports from a standard workstation.

Web Tools provides the following information and capabilities:

- ◆ Monitoring of and the ability to manage the entire fabric:
 - The status of all switches in the fabric.
 - Access to event logs for entire fabric
 - Zoning functions
 - Access to the Name Server Table
 - Telnet functions
 - Switch beaconing for rapid identification in large fabric environments
 - Loop diagnostics and query and control of loop interfaces to aid in locating faulty devices
 - Ability to name and zone QuickLoops™
- ◆ Monitoring of and the ability to manage individual switches:
 - Summary information about each switch
 - Access to event logs for individual switches
 - Switch configuration and administration
 - Ability to upgrade Fabric OS and license key administration
 - Report capability for switch configuration information
- ◆ Monitoring of and the ability to manage individual ports:
 - Port status
 - Information about GBIC (Gigabit Interface Converter) Serial IDs
 - Information about connected devices
 - Loop information
 - Port performance including frame counts (frames in, frames out) and error counts

Web Tools Views

Web Tools provides access to and information about the fabric through a number of separate windows, making it possible to view several aspects of the fabric at the same time (Table 1-1).

Table 1-1 **Web Tools Views**

Initial Display Upon Launching Web Tools:	
Fabric View	<p>Displays a control panel that provides access to fabric-wide options, a panel for each switch in the fabric, plus a legend that explains the meaning of the background colors on the Switch icons. Each panel contains an icon that represents the switch itself, in addition to icons for Switch Events and the Administrative and Telnet interfaces. The background color of the switch icon represents the status of that particular switch or Integrated Fabric (as defined by the legend provided in the window).</p> <p>Switch status is calculated approximately once per second; however the initial calculation does not occur until 30-60 seconds after the switch is booted. It is calculated from the state of data structures in the switch, and stored as the variable <code>switchStatus</code>.</p> <p>For all statuses that are based on errors per time interval, any errors will cause the status to show faulty until the entire sample interval has passed.</p>
Accessible from Fabric View:	
Fabric Events View	Displays the error log for the fabric, which is the combination of the error logs of all the switches in the fabric. Accessed by clicking on the Fabric Events icon on the control panel.
Fabric Topology View	Displays physical configuration, including active domains, paths, and routing information. Accessed by clicking on the Fabric Topology icon on the control panel.
Name Server Table View	Displays the Name Server Table for the fabric. Use to view information about the devices attached to the fabric. Accessed by clicking on the Name Server icon on the control panel.

Table 1-1 Web Tools Views (*continued*)

Zone Administration View	Provides an interface to Zoning, including zone settings, zone aliases, QuickLoops, Fabric Assists, and zone configurations. Accessed by clicking on the Zone Admin icon on the control panel.
Summary View/Detail View	Toggles between summarized and detailed versions of Fabric View.
Switch View	Displays information about individual switches, including a real-time view of switch status. Accessed by clicking on the Switch icon on a switch panel. The Switch View is also the launch point for the Switch Events View, Telnet Interface, Fabric Watch View, Administrative Interface, Performance View, and Port Information View. It includes icons that display the status of the switch fans, temperature monitors, and beacon.
Switch Events View	Displays the error log for the switch. Accessed by clicking on the Events icon on the switch panel. This view can also be accessed through Switch View (see <i>Switch Events View</i> on page 1-5).
Telnet Interface	Provides an interface for using Telnet commands for switch diagnostics, troubleshooting, and fabric management. Accessed by clicking on the Telnet icon on the switch panel. This view can also be accessed through Switch View (see <i>Telnet Interface</i> on page 1-5).
Administrative Interface	Provides an interface for performing functions such as upgrading firmware versions or reconfiguring a switch. Accessed by clicking on the Admin icon on the switch panel. This view can also be accessed through Switch View (see <i>Administrative Interface</i> on page 1-5).

Table 1-1 Web Tools Views (*continued*)

Accessible From Switch View (<i>continued</i>):	
Port Information View	Displays statistics and status for the selected port, GBIC, or loop. Also provides options for managing loops. Accessed by clicking on the icon for the relevant port in Switch View.
Power Supply Status	The Power Supply icons on the switch graphic indicate the number of power supplies present, and the LED on the power supply indicates the status of the power assemblies.
Switch Events View	Displays the error log for the switch. Accessed by clicking on Events in Switch View. This view can also be accessed through Fabric View (see <i>Fabric View</i> on page 1-3).
Telnet Interface	Provides an interface for using Telnet commands for switch diagnostics, troubleshooting, and detailed fabric management. Accessed by clicking on Telnet in Switch View. This view can also be accessed through Fabric View (see <i>Fabric View</i> on page 1-3).
Fabric Watch View	Monitors fabric elements and displays error and performance counter status, issuing an alert when conditions are out of acceptable ranges. Accessed by clicking on Watch in Switch View.
Fan Icon	The color of this icon indicates the number of fans in the switch that are within normal range (see the color legend in Fabric View).
Administrative Interface	Provides an interface for performing functions such as upgrading firmware versions or reconfiguring a switch. Accessed by clicking on Admin in Switch View. This view can also be accessed through Fabric View (see <i>Fabric View</i> on page 1-3).
Performance View	Graphically portrays real-time data throughput for each port and displays total switch bandwidth utilization. Accessed by clicking on Perf in Switch View.
Beacon Icon	Click to turn the beacon, which is an indicator light on the front panel of the switch, on or off. Appearance of icon indicates whether beacon is lit.
Temperature Icon	The color of this icon indicates the number of temperature sensors in the switch that are within range (see the color legend in Fabric View).

This chapter provides the following information:

- ◆ Requirements.....2-2
- ◆ Installation.....2-3

Requirements

The workstation and the switch must both meet specific requirements for the correct installation and operation of Web Tools.

Switch Requirements

Web Tools version 2.3 can be used to manage switches that meet the following requirements:

- ◆ Switches: EMC Models DS-16B and DS-8B
- ◆ Fabric OS version 2.3

Workstation Requirements

The following items are required for the correct installation and operation of Web Tools:

- ◆ One of the following operating systems:
 - Solaris® 2.61 or later
 - Windows® 95, 98, or 2000
 - Windows NT 4.0
- ◆ Adequate RAM (required for Windows operating systems only):
 - 128 MB for fabrics of 21 switches or less
 - 256 MB for fabrics containing more than 21 switches
- ◆ 5 MB of free disk space
- ◆ One of the following web browsers:
 - Netscape® Communicator® 4.51 or later
 - Internet Explorer® 4.01 or later
- ◆ The correct version of the Java® Plug-in for the operating system:
 - Windows 95, 98, NT, or 2000: Java Plug-in version 1.2.2-006 or later
 - Solaris: Java Plug-in version 1.2.2-02 for Solaris, including the Java Plug-in patch created by Sun for Solaris

Installation

Web Tools

Web Tools software has been preinstalled at the factory.

Additional Software

If the following software is not already installed and configured on your system, you will have to perform the following steps to prepare Web Tools for use to manage your fabric:

- ◆ Installation of one of the supported web browsers on the workstation, if not already installed.
- ◆ Configuration of the web browser for use with Web Tools.
- ◆ Installation of the required Java Plug-in on the workstation, if not already installed.

Installing a Web Browser

If not already installed, install one of the following browsers:

- ◆ Netscape Communicator 4.51 or later (available at <http://www.netscape.com>).
- ◆ Internet Explorer 4.01 or later (available at <http://www.microsoft.com>).

Configuring the Web Browser

Specific browser settings are required for the correct operation of Web Tools with either Netscape Communicator or Internet Explorer.

Configuring Netscape Communicator

Step 1 The web browser cache must be cleared after the installation of Fabric OS version 2.3. Some browsers use local cache copies of jar files and/or image files to improve performance (depending on the options selected in browser), which can cause incorrect display in Web Tools.

To remove cached files from Netscape Communicator:

1. Select **Edit, Preferences**.
2. Select **Advanced** in the left text box to expand it, then click **Cache**.
3. On the **Cache** panel, select **Clear Memory Cache**.
4. Click **Clear Disk Cache**.

5. Click **OK**.
6. Exit and relaunch the browser.

Step 2 Browser pages must be refreshed at every visit to ensure the correct operation of the Switch Admin feature. To set the refresh frequency:

1. Select **Preferences** from the **Edit** menu.
2. Click to expand the **Advanced** category and click **Cache**.
3. From **Document in cache is compared to document on network**, select **Every time**.
4. Click **OK**.

Configuring Internet Explorer

Correct operation of Web Tools with Internet Explorer requires clearing the browser cache after installation, and specifying the appropriate settings for browser refresh frequency and process model.

Step 1 The browser cache must be cleared after the installation of Fabric OS version 2.3. The browser may use local cache copies of jar files and/or image files to improve performance (depending on options selected in browser), which can cause incorrect display.

To remove cached files from Internet Explorer:

1. Select **Internet Options** from the **View** menu if using Internet Explorer 4.x, or from the **Tools** menu if using 5.x.
2. Select the **General** tab.
3. From **Temporary Internet Files**, select **Delete Files**.
4. Click **OK**, then exit and relaunch the browser.

Step 2 Browser pages must be refreshed at every visit to ensure the correct operation of the Switch Admin feature.

To set the refresh frequency:

1. Select **Internet Options** from the **View** menu if using Internet Explorer 4.x, or from the **Tools** menu if using 5.x.
2. From **Temporary Internet Files**, select the **General** tab and click **Settings**.
3. From **Check for newer versions of stored pages**, select **Every visit to the page**.

Step 3 The correct Browser Process Model must be selected.

To select the Browser Process Model:

1. Select **View, Internet Options** if using Internet Explorer 4.x, or **Tools, Internet Options** if using Internet Explorer 5.x.
2. Select the **Advanced** tab and click to expand the Browsing category.
3. From **Browsing**, select **Browse in a new process**, if using Internet Explorer 4.x, or **Launch browser windows in a separate process**, if using Internet Explorer 5.0.

Installing the Java Plug-in on the Workstation

A Java Plug-in must be installed on the workstation for the correct operation of Web Tools. The required version depends on the operating system.

Installing the Java Plug-in on Solaris

Solaris workstations require both the Java Plug-in version 1.2.2-02 for Solaris and the patch created by Sun Microsystems for use with the Java Plug-in on Solaris.

To install the Java Plug-in on Solaris:

1. Locate the Java Plug-in on the internet, such as at the Sun Microsystems website.
2. Follow the instructions to install the Java Plug-in for Solaris.
3. Open the .cshrc file and set the path to the Java Plug-in executable file. For example, the following could be added to the .cshrc file:

```
NPX_PLUG-IN_PATH=/opt/NSCPcom/plugin
export NPX_PLUG_IN_PATH
```

To install the patch on Solaris:

1. Go to the website at <http://access1.sun.com>, use the SEARCH option to locate the correct patch for your Solaris version:
for Solaris 2.6 and 2.7, use the SEARCH option and enter the string **108593** in the search field and press **enter**.
or,
for Solaris 2.8, use the SEARCH option and enter the string **109611** in the search field and press **enter**.

2. Follow the link to download the patch, and exit the browser when done.
3. Install the patch and reboot the system.
4. Relaunch the browser and enter the switch's IP Address.

Installing the Java® Plug-in on Windows® 2000 or Windows NT Platforms

Windows 95, 98, 2000 and NT workstations require Java Plug-in version 1.2.2-006 or later.

To determine the version of the Java Plug-in installed on Windows 98, NT, or 2000, and install if necessary:

Determine whether the correct Java Plug-in version is installed, and install if necessary:

- If the correct version is installed, Web Tools is ready to use.
- If no Java Plug-in is installed, Web Tools will provide a link to the appropriate link to the Sun Microsystems website, download the correct Java Plug-in, then double-click the downloaded file to install the plug-in.
- If an outdated version is currently installed, uninstall it, relaunch the browser, follow the link to the Sun Microsystems website, and download the new Java Plug-in.

You can launch Web Tools once the Java Plug-in is installed on the client machine.

To launch Web Tools:

1. Launch the web browser.
2. Enter the switch name or IP address (such as `http://switch name/`) in the **Location/Address** field and press **Enter**.

Web Tools launches, displaying the default view, Fabric View. For more information about Fabric View, see *Fabric View* on page 3-2.

This chapter describes the views and interfaces available through Web Tools, which consist of the following:

◆ Fabric View	3-2
◆ Fabric Events View	3-7
◆ Fabric Topology View	3-9
◆ Name Server Table View	3-13
◆ Zone Administration View	3-16
◆ Switch View	3-29
◆ Switch Events View	3-33
◆ Port Information View	3-35
◆ Fabric Watch View	3-48
◆ Performance View	3-55

Switches can be accessed through different methods, such as through the Front Panel, Telnet, SNMP, and the web, any of which can occur simultaneously. To verify that modifications are correctly applied, ensure that the switch is modified from only one connection at a time.

Fabric View

The Fabric View is the first web page that displays when you connect to a switch, and it provides access to specific information about each switch, in addition to other options and a legend explaining the colors used to indicate switch status. Every switch in the fabric is represented by a switch panel in Fabric View.

To launch Web Tools and access Fabric View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**.

`http://switch name/`

This switch is assumed to be in the local domain. To get information specific to a QuickLoop, the QuickLoop switch must be in the host domain.

Web Tools launches, displaying Fabric View (Figure 3-1).

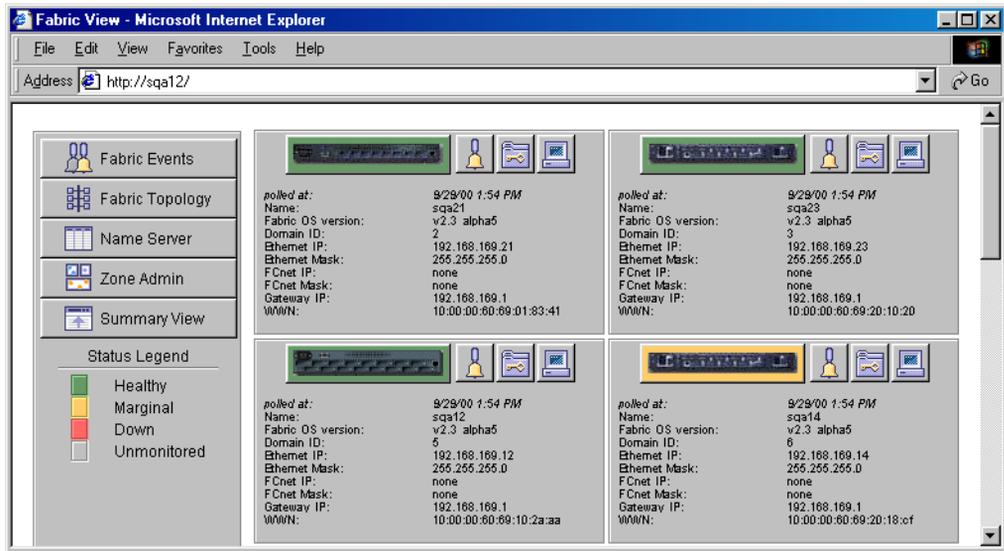


Figure 3-1 Fabric View

Table 3-1 describes the items visible in Fabric View.

Table 3-1 Fabric View Components

Component	Description
The Control Panel (on the left side of Figure 3-1 on page 3-3)	
Fabric Events	Opens Fabric Events View (for information about this view, see <i>Fabric Events View</i> on page 3-7).
Fabric Topology	Opens Fabric Topology View (for information about this view, see <i>Fabric Topology View</i> on page 3-9).
Name Server	Opens Name Server Table View (for information about this view, see <i>Name Server Table View</i> on page 3-13).
Zone Admin	Opens Zone Administration View (for information about this view, see <i>Zone Administration View</i> on page 3-16).

Table 3-1 Fabric View Components (*continued*)

Component	Description
Summary/Detail View	Toggles the Summary or Detail version of Fabric View. The Summary version shows abbreviated switch panels (see Figure 3-2 on page 3-6). Detail is the default view.
Status legend	<p>Defines meaning of colors visible in the background of the switch icons. Each color indicates a different operational state:</p> <ul style="list-style-type: none"> • Green — Healthy • Yellow — Marginal (mix of good and faulty readings) • Red — Down (more than two faulty readings) • Gray — Unknown or unmonitored <p>If no data is available from a switch, Web Tools displays the most recent background color.</p> <hr/> <p>For all statuses that are based on errors per time interval, any errors will cause the status to show faulty until the entire sample interval has passed.</p> <hr/>
The Switch Panel (on the right side of Figure 3-1 on page 3-3.)	
Switch	Opens Switch View for the switch. Each switch type is represented by a different icon. The background color around the icon indicates the status of the switch (for information about this view, see <i>Switch View</i> on page 3-29).
Events	Opens Switch Events View to display the switch events log (for information about this view, see <i>Switch Events View</i> on page 3-33).
Admin	Opens Switch Administration View (for information about this view, see <i>Administrative Interface</i> on page 4-2).
Telnet	Launches the Telnet Interface for the switch (for information about this view, see <i>Telnet Interface</i> on page 4-23).

Table 3-1 Fabric View Components (*continued*)

Component	Description
polled at or unreachable since	Time of the last status check, or if currently unavailable, the time of the last successful status check.
Name	The name of the switch.
Fabric OS version	Version of Fabric OS installed on the switch.
Domain ID	A number that uniquely identifies the switch within the fabric.
Ethernet IP	Ethernet IP address.
Ethernet Mask	Ethernet subnetmask.
FCnet IP	Fibre channel IP address.
FCnet Mask	Fibre channel subnetmask.
Gateway IP	Gateway IP address.
WWN	Unique numeric identifier for the switch; assigned by manufacturer.
The Control Panel (on the left side of Figure 3-1 on page 3-3)	
Fabric Events	Opens Fabric Events View (for information about this view, see <i>Fabric Events View</i> on page 3-7).
Fabric Topology	Opens Fabric Topology View (for information about this view, see <i>Fabric Topology View</i> on page 3-9).
Name Server	Opens Name Server Table View (for information about this view, see <i>Name Server Table View</i> on page 3-13).

Figure 3-2 illustrates Fabric View with the Summary View selected.

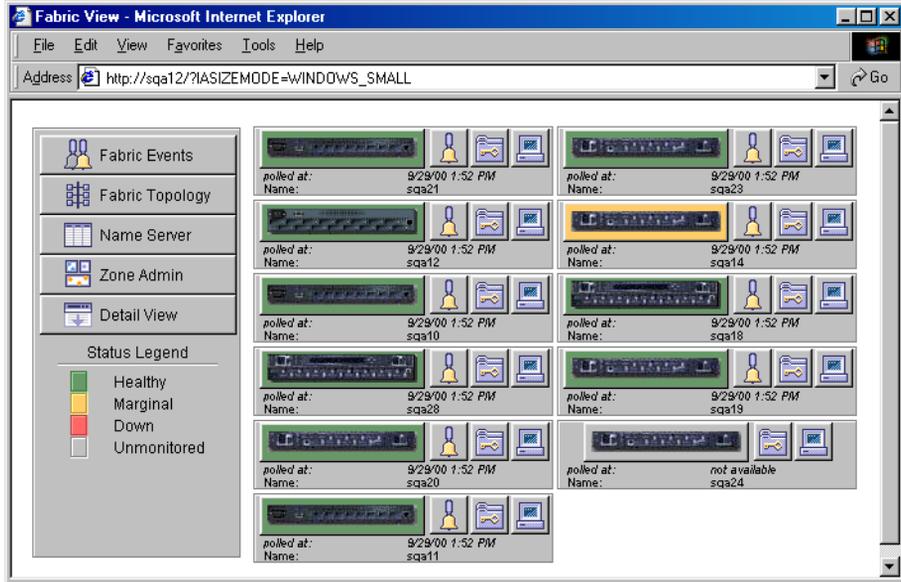


Figure 3-2 Summary Version — Fabric View

Fabric Events View

The Fabric Events View provides a running log of events for all switches in the fabric.

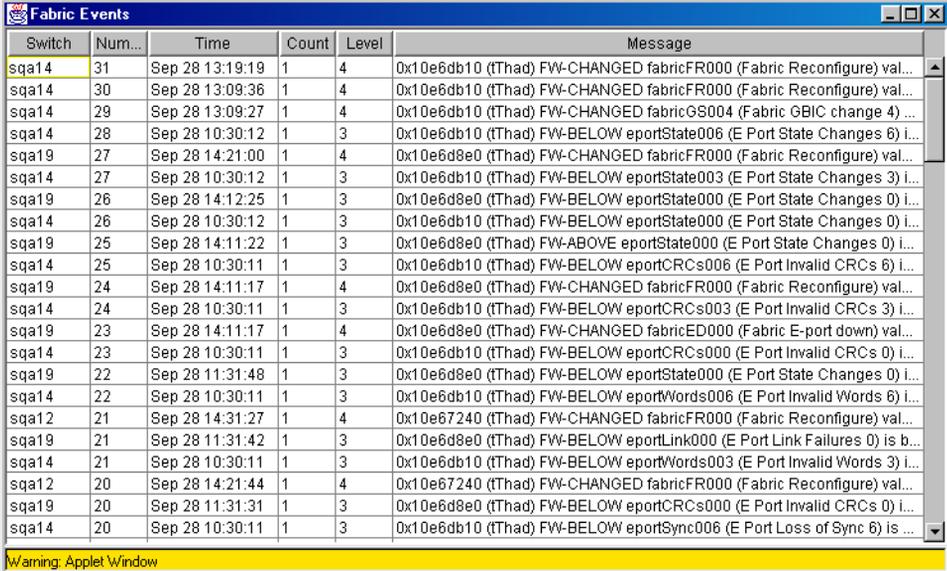
To access Fabric Events View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

```
http://switch name/
```

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click **Fabric Events**. The Fabric Events View (Figure 3-3) displays.



Switch	Num...	Time	Count	Level	Message
sqa14	31	Sep 28 13:19:19	1	4	0x10e6db10 (TThad) FW-CHANGED fabricFR000 (Fabric Reconfigure) val...
sqa14	30	Sep 28 13:09:36	1	4	0x10e6db10 (TThad) FW-CHANGED fabricFR000 (Fabric Reconfigure) val...
sqa14	29	Sep 28 13:09:27	1	4	0x10e6db10 (TThad) FW-CHANGED fabricGS004 (Fabric GBIC change 4) ...
sqa14	28	Sep 28 10:30:12	1	3	0x10e6db10 (TThad) FW-BELOW eportState006 (E Port State Changes 6) i...
sqa19	27	Sep 28 14:21:00	1	4	0x10e6d8e0 (TThad) FW-CHANGED fabricFR000 (Fabric Reconfigure) val...
sqa14	27	Sep 28 10:30:12	1	3	0x10e6db10 (TThad) FW-BELOW eportState003 (E Port State Changes 3) i...
sqa19	26	Sep 28 14:12:25	1	3	0x10e6d8e0 (TThad) FW-BELOW eportState000 (E Port State Changes 0) i...
sqa14	26	Sep 28 10:30:12	1	3	0x10e6db10 (TThad) FW-BELOW eportState000 (E Port State Changes 0) i...
sqa19	25	Sep 28 14:11:22	1	3	0x10e6d8e0 (TThad) FW-ABOVE eportState000 (E Port State Changes 0) i...
sqa14	25	Sep 28 10:30:11	1	3	0x10e6db10 (TThad) FW-BELOW eportCRCs006 (E Port Invalid CRCs 6) i...
sqa19	24	Sep 28 14:11:17	1	4	0x10e6d8e0 (TThad) FW-CHANGED fabricFR000 (Fabric Reconfigure) val...
sqa14	24	Sep 28 10:30:11	1	3	0x10e6db10 (TThad) FW-BELOW eportCRCs003 (E Port Invalid CRCs 3) i...
sqa19	23	Sep 28 14:11:17	1	4	0x10e6d8e0 (TThad) FW-CHANGED fabricED000 (Fabric E-port down) val...
sqa14	23	Sep 28 10:30:11	1	3	0x10e6db10 (TThad) FW-BELOW eportCRCs000 (E Port Invalid CRCs 0) i...
sqa19	22	Sep 28 11:31:48	1	3	0x10e6d8e0 (TThad) FW-BELOW eportState000 (E Port State Changes 0) i...
sqa14	22	Sep 28 10:30:11	1	3	0x10e6db10 (TThad) FW-BELOW eportWords006 (E Port Invalid Words 6) i...
sqa12	21	Sep 28 14:31:27	1	4	0x10e67240 (TThad) FW-CHANGED fabricFR000 (Fabric Reconfigure) val...
sqa19	21	Sep 28 11:31:42	1	3	0x10e6d8e0 (TThad) FW-BELOW eportLink000 (E Port Link Failures 0) is b...
sqa14	21	Sep 28 10:30:11	1	3	0x10e6db10 (TThad) FW-BELOW eportWords003 (E Port Invalid Words 3) i...
sqa12	20	Sep 28 14:21:44	1	4	0x10e67240 (TThad) FW-CHANGED fabricFR000 (Fabric Reconfigure) val...
sqa19	20	Sep 28 11:31:31	1	3	0x10e6d8e0 (TThad) FW-BELOW eportCRCs000 (E Port Invalid CRCs 0) i...
sqa14	20	Sep 28 10:30:11	1	3	0x10e6db10 (TThad) FW-BELOW eportSync006 (E Port Loss of Sync 6) is ...

Warning: Applet Window

Figure 3-3 Fabric Events View

To sort the events by a particular column, click the column header.
To resize a column, drag the column divider.

Table 3-2 describes the columns in the Fabric Events view.

Table 3-2 Fabric Events Columns

Column	Description
Switch	Displays the name of the switch
Num... (number)	Displays the event number for an affected switch
Time	Displays the time of an event
Count	Displays the number of consecutive occurrences of same event
Level	Displays the severity level of an event: 0-panic (switch reboots) 1-critical 2-Error 3-warning 4-information 5-debug
Message	Describes the event

Fabric Topology View

The Fabric Topology View summarizes the physical configuration of the fabric from the perspective of the *local domain* (the domain of the switch entered as a URL in the web browser). This includes information about the *destination domains* (all other domains in the fabric) and the paths between each destination domain and the local domain.

To access Fabric Topology View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

`http://switch name/`

The switch entered into the web browser is identified by Web Tools as the local domain.

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click **Fabric Topology**. The Fabric Topology View (Figure 3-4) displays.

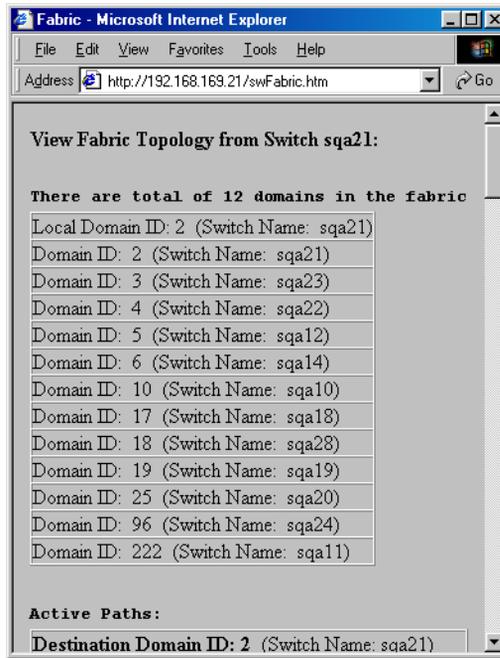


Figure 3-4 Fabric Topology View

The window can be scrolled downwards to display information (Figure 3-5) about the individual paths between the local switch and each of the other switches in the fabric.



Figure 3-5 Fabric Topology View, Scrolled Downwards

Table 3-3 describes the fields in the Fabric Topology View.

Table 3-3 Fabric Topology View

Field	Description
View Fabric Topology from Switch [switch name]	Lists the switch in the domain that is assumed to be the local domain.
There are a total of [n] domains in the fabric:	The number of domains in the fabric.
Local domain ID	A number that uniquely identifies the local switch within the fabric, and the name of the switch.
Domain ID (may be more than one)	A number that uniquely identifies the switch within the fabric, and the name of the switch.
Active Paths:	This line is followed by information about each destination domain, including information about each of the paths between that domain and the local domain.

Table 3-3 Fabric Topology View (*continued*)

Destination Domain ID	The ID of the destination domain that is described in the lines following the ID. This information and the two lines following it display for each destination domain in the fabric.
Destination's Worldwide Name	The WWN of the destination domain.
Number of Paths	The number of active paths between the destination domain and the local domain.
Path Number	The number assigned to the specific path described in the table that follows this information. This information and the following table display for each path for which the domain described above is the destination.
Output Ports	The number of output ports on the path between the destination domain and the local domain.
Input Ports	The number of input ports on the path between the destination domain and the local domain.
Hop Count	The number of hops (interswitch links) between the local domain and the destination domain.
Metric	Metrics for traffic flow along the path.
Flag	The flag assigned to the path.

Name Server Table View

The Name Server Table View provides the name server entries listed in the Simple Name Server database. This includes all name server entries for the fabric, not only those that are local to the local domain. Each row in the table represents a different device.

To access Name Server Table View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**.

`http://switch name/`

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click **Name Server**. The Name Server Table View (Figure 3-6) displays.

Domain #	Port #	Port ID	Port Type	Port WWN	Node WWN	Symbolic Name
19	1	131121	N	10:00:00:00:c9:22:29:8c	00:00:00:00:00:00:00	NULL
19	2	1312ef	NL	21:00:00:e0:8b:01:57:f8	20:00:00:e0:8b:01:57:f8	NULL
19	3	131321	N	21:00:00:e0:8b:01:e6:ad	20:00:00:e0:8b:01:e6:ad	NULL
222	0	de1021	N	10:00:00:e0:69:f0:15:1c	10:00:00:e0:69:f0:15:1c	NULL
222	7	de1721	N	21:00:00:e0:8b:01:e1:ad	20:00:00:e0:8b:01:e1:ad	NULL
2	7	0217e1	NL	21:00:00:20:37:11:17:ab	20:00:00:20:37:11:17:ab	[28]*SEAGATE ST118273 CLAR18
2	7	0217e2	NL	21:00:00:20:37:11:1d:6f	20:00:00:20:37:11:1d:6f	[28]*SEAGATE ST118273 CLAR18
2	7	0217e4	NL	21:00:00:20:37:11:12:05	20:00:00:20:37:11:12:05	[28]*SEAGATE ST118273 CLAR18
2	7	0217e8	NL	21:00:00:20:37:11:1b:54	20:00:00:20:37:11:1b:54	[28]*SEAGATE ST118273 CLAR18
2	7	0217ef	NL	21:00:00:20:37:11:1a:8a	20:00:00:20:37:11:1a:8a	[28]*SEAGATE ST118273 CLAR18
2	7	0217d6	NL	21:00:00:20:37:11:1d:47	20:00:00:20:37:11:1d:47	[28]*SEAGATE ST118273 CLAR18
2	7	0217d9	NL	21:00:00:20:37:11:19:58	20:00:00:20:37:11:19:58	[28]*SEAGATE ST118273 CLAR18
2	7	0217da	NL	21:00:00:20:37:11:1d:39	20:00:00:20:37:11:1d:39	[28]*SEAGATE ST118273 CLAR18
2	7	0217dc	NL	21:00:00:20:37:11:1d:7c	20:00:00:20:37:11:1d:7c	[28]*SEAGATE ST118273 CLAR18
2	7	0217e0	NL	21:00:00:20:37:11:1c:0c	20:00:00:20:37:11:1c:0c	[28]*SEAGATE ST118273 CLAR18
10	7	0a17e4	NL	22:00:00:20:37:00:b5:ba	20:00:00:20:37:00:b5:ba	[28]*SEAGATE ST39102FC F3

Figure 3-6 Name Server Table View

To sort the events by a particular column, click the column header. To resize a column, drag the column divider.

The following fields are included in the Name Server Table View:

Table 3-4 Name Server Table View Fields

Field	Description
Auto Refresh	Enables Auto Refresh or uncheck to disable.
Auto Refresh Interval	If Auto Refresh is checked, enters the number of seconds for the refresh interval.
Refresh	Refreshes the window display.
Done	Closes the window.

The Name Server Table contains the following columns:

Table 3-5 Name Server Table View Columns

Column	Description
Domain #	The domain ID of the switch to which the device is connected.
Port #	The number of the switch port to which the device is connected.
Port ID	The port ID of the device (24-bit hexadecimal value).
Port Type	The port type of the device (N for fabric direct attached port or NL for fabric direct attached loop port).
Port WWN	The worldwide name of the device port.
Node WWN	The worldwide name of the device node.
Symbolic Name	The symbolic name of the device assigned through the SCSI INQUIRY command.
FC4 Types	The fibre channel FC4 layer types supported by the device, such as IP or FCP.
COS	The fibre channel classes of service supported by the device.
Fabric Port Name	The name of the fabric port in use by the device.

Table 3-5 Name Server Table View Columns (*continued*)

Port IP Address	The IP address of the fabric port.
Hard Address	The hard address of the fabric port.
Member of Zones	The zones to which this device belongs. This column does not update when the table is refreshed. To view updated zoning information, close and reopen the Name Server Table.

Zone Administration View

Administrative privileges are required to access this view. If a switch or device is added or removed from the network, it is necessary to save the changes and relaunch the Zone Administration view for the changes to take effect.

When administering Zoning, EMC recommends that you perform the following steps:

1. Define a zone alias for each individual device to make zone administration easier.
2. Create zones and add zone members.
3. Place zones into one or more zone configurations.
4. Enable one of the zone configurations (only one can be enabled at a time).

There are three separate methods for adding members to a zone. Each method corresponds to a *zoning mode*, and the combination of the methods corresponds to an additional mode. Once you select a mode, all zoning operations must correspond to that mode, and any zones, aliases, and configuration files which do not cannot be selected.

EMC recommends the use of WWN Zoning. See Table 3-6 for more information on this mode.

Table 3-6 Adding Members to a Zone

Zoning Mode Method	Description
Port Level Zoning	Zoning by physical domain/port number. All alias, zoning, and configuration file operations must be performed using port. Aliases, zones, and configuration files which have objects other than ports cannot be selected or operated on.
WWN Level Zoning	Zoning by WWNs only. All alias, zoning, and configuration file operations must be performed by WWNs. Aliases, zones, and configuration files that have objects other than WWNs cannot be selected or operated on.

Table 3-6 Adding Members to a Zone (*continued*)

Mixed Level Zoning	Zoning by physical domain/port number or WWN. With mixed level zoning, any object can be selected to be a member of a zone, alias, or configuration file. This mode is supported for backward compatibility with all 2000-series switches.
---------------------------	--

For more information about using Zoning, refer to the *Departmental Switches Model DS-16B and DS-8B Zoning User Guide*.

To access the Zone Administration View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. This switch is assumed to be the local domain.

```
http://switch name/
```

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click **Zone Admin**.

The Zone Administration View displays (Figure 3-7).

For information specific to QuickLoop to be available, the QuickLoop switch must be the local domain.

The following is a list of the tabs provided in the Zone Admin View, and the pages on which they are described:

- ◆ *Alias Tab* on page 3-18
- ◆ *Zone Tab* on page 3-20
- ◆ *QuickLoop Tab* on page 3-22
- ◆ *Fabric Assist Tab* on page 3-24
- ◆ *Config Tab* on page 3-27

Alias Tab

You use the Alias tab (Figure 3-7) to create and manage aliases for devices in the fabric. An alias can have one or more members, including switches, ports, WWNs, and QuickLoop AL_PAs.

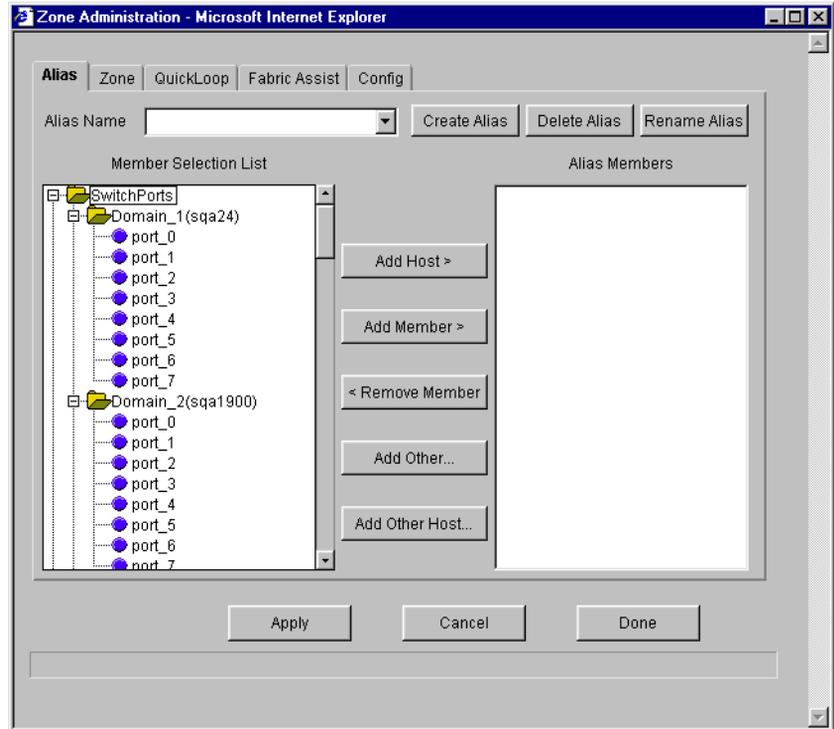


Figure 3-7 Alias Tab — Zone Administration View

Table 3-7 describes the fields on the Alias tab.

Table 3-7 Alias Tab Fields

Field	Description
Alias Name	To modify an existing alias, select an alias name.
Create Alias	Click to create a new alias. A dialog displays in which you can enter the name of the new alias. All names must be unique and contain no spaces or dash "-" characters.
Delete Alias	Click to delete the alias selected in the Alias Name field. Deleting an alias automatically removes it from all zones.

Table 3-7 Alias Tab Fields (*continued*)

Rename Alias	Renames the alias selected in the Alias Name field. A dialog displays in which you can edit the alias name. Renaming an alias automatically renames it in all zones.
Member Selection List	Provides a list of potential alias members, including switches, ports, WWNs, QuickLoop AL_PAs, and Fabric Assists.
Add Member	Adds the item selected in the Member Selection List to the Alias Members list. You can add individual ports or an entire switch. If a switch is added, all ports on the switch are added. To add a device WWN, select either a node WWN (folder icon) or port WWN (blue circle icon) from the WWN sub-tree.
Remove Member	Removes the selected member selected from the [Alias name] Members list.
Add Other	Adds a WWN, switch port, QuickLoop AL_PA, or Fabric Assist that is not available in the Member Selection List.
Alias Members	The member list of the alias selected in the Alias Name field. The name of this list depends on the name of the selected alias. If no alias is selected, the name displays as <code>null Members</code> .
Apply	Applies all changes made since the Zone Administration View was opened, including changes made on other tabs in the view. Changes cannot be cancelled once applied.
Cancel	Cancels all changes made since changes were last applied, and to exit the Zone Administration View. Changes cannot be cancelled once they are applied.
Done	Applies all changes made since the Zone Administration View was opened and to exit the Zone Administration View.

Zone Tab

You can use the Zone tab (Figure 3-8) to create and manage zones. A zone can have one or multiple members, and can include switches, ports, WWNs, aliases, and QuickLoop AL_PAs.

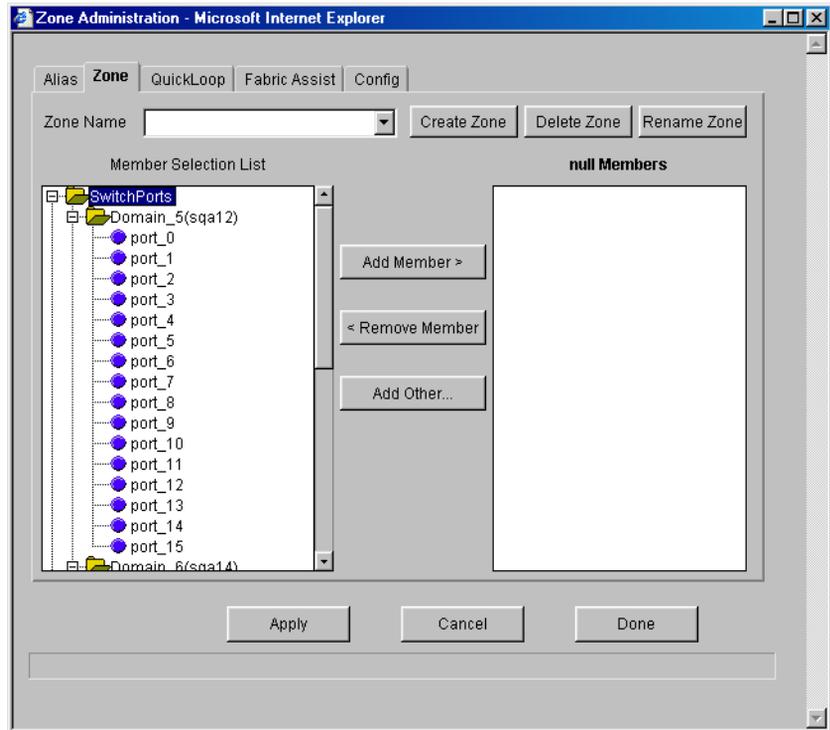


Figure 3-8 Zone Tab — Zone Administration View

Table 3-8 describes the fields on the Zone tab.

Table 3-8 Zone Tab Fields

Field	Description
Zone Name	Modifies an existing zone, select a zone name.
Create Zone	Creates a new zone. A dialog displays in which you can enter the name of the new zone. All names must be unique and contain no spaces or dash "-" characters.

Table 3-8 Zone Tab Fields (*continued*)

Delete Zone	Deletes the zone selected in the Zone Name field. Deleting a zone automatically removes it from all zone configurations.
Rename Zone	Renames the zone selected in the Zone Name field. A dialog displays in which you can edit the name of the zone.
Member Selection List	A list of potential zone members, including switches, ports, WWNs, aliases, QuickLoop AL_PAs, and Fabric Assists.
Add Member	Adds the member selected in the Member Selection List to the Zone Members list. If an entire switch is selected, all ports on the switch are added to the zone. You can also select individual ports. To add a device WWN, select either a node WWN (folder icon) or port WWN (blue circle icon) from the WWNs subtree. To add an alias to the zone, select it from the Aliases subtree (the alias must already exist).
Remove Member	Removes the selected member from the [Zone name] Members list.
Add Other	Adds a WWN, switch, port, or QuickLoop AL_PA that is not listed in the Member Selection List.
[Zone name] Members	The members of the zone selected in the Zone Name field. The name of this list depends on the name of the selected zone. If no zone is selected, the name displays as null Members.
Apply	Applies all changes made since the Zone Administration View was opened, including changes made on other tabs in the view. Changes cannot be cancelled once they are applied.
Cancel	Cancels all changes since the changes were last applied and to exit Zone Administration. Changes cannot be cancelled once they are applied.
Done	Applies all changes made since the Zone Administration View was opened and to exit the Zone Administration View.

QuickLoop Tab

You use the QuickLoop tab (Figure 3-9) to create and manage QuickLoops if used in conjunction with Zoning. For information on managing the QuickLoop feature separately, see *Loop Tab* on page 3-43. Refer to *Departmental Switch Models DS-16B and DS-8B Zoning Reference Manual* for more information on zoning

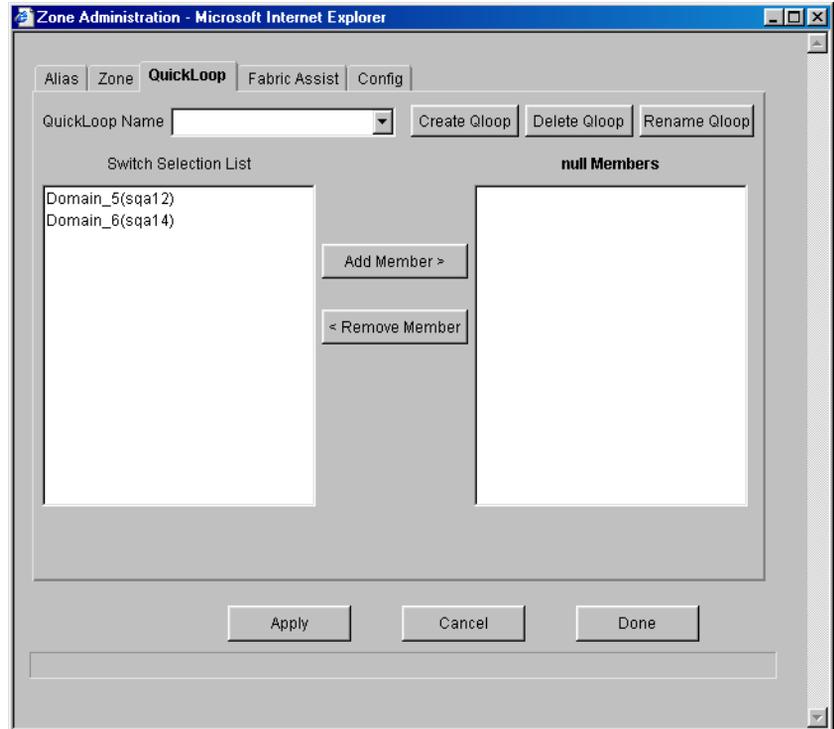


Figure 3-9 QuickLoop Tab — Zone Administration View

Table 3-9 describes the fields on the QuickLoop tab.

Table 3-9 QuickLoop Tab Fields

Field	Description
QuickLoop Name	Modifies an existing QuickLoop name.
Create Qloop	Creates a new QuickLoop. A dialog displays in which you can enter the name of the new QuickLoop. All names must be unique and contain no spaces.

Table 3-9 QuickLoop Tab Fields (*continued*)

Delete Qloop	Deletes the QuickLoop selected in the QuickLoop Name field. Deleting a QuickLoop automatically removes it from all aliases, zones, and zone configurations, including the associated AL_PAs.
Rename Qloop	Edits the name of the QuickLoop selected in the QuickLoop Name field. A dialog displays in which you can edit the name of the QuickLoop.
Switch Selection List	Lists the switches available to add to the QuickLoop.
Add Member	Adds the selected switch in the Switch Selection List to the QuickLoop Members list.
Remove Member	Removes the selected member from the [QuickLoop name] Members list.
[QuickLoop name] Members	Lists the members of the QuickLoop currently selected in the QuickLoop Name field. The name of this list depends on the name of the selected QuickLoop. If no QuickLoop is selected, the name displays as <i>null Members</i> .
Apply	Applies all changes made since the Zone Administration View was opened, including changes made on other tabs in the view. Changes cannot be cancelled once they are applied.
Cancel	Cancels all changes since the changes were last applied and to exit Zone Administration. Changes cannot be cancelled once they are applied.
Done	Applies all changes made since the Zone Administration View was opened and to exit the Zone Administration View.

Fabric Assist Tab

You can use the Fabric Assist tab (Figure 3-10) to create and manage Fabric Assists.

EMC does not currently support Fabric Assist.

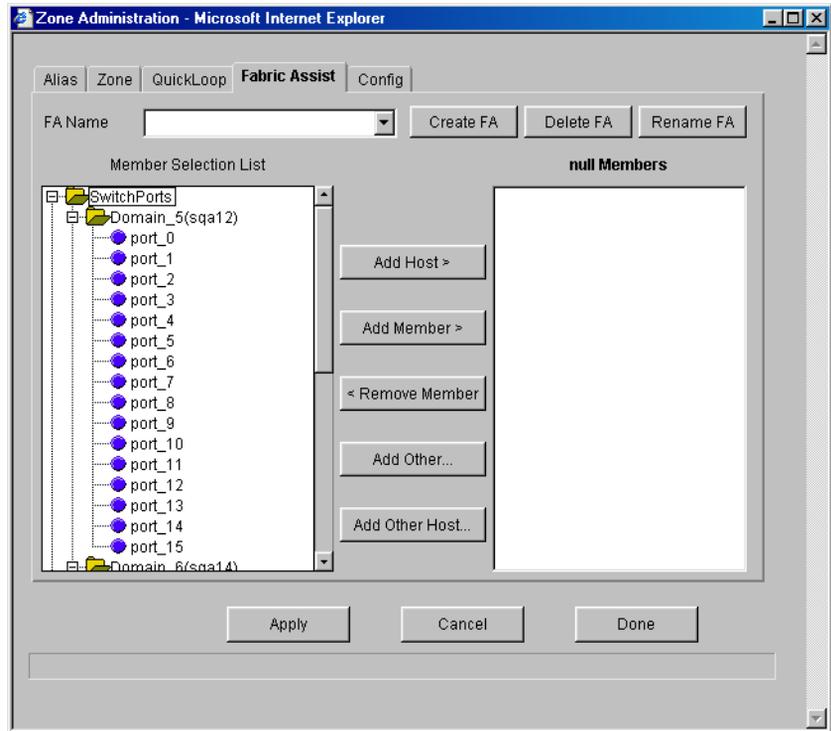


Figure 3-10 Fabric Assist Tab — Zone Administration View

Table 3-10 describes the fields on the Fabric Assist tab.

Table 3-10 Fabric Assist Tab Fields

Field	Description
FA Name	Modifies an existing Fabric Assist, select a Fabric Assist name.
Create FA	Creates a new Fabric Assist. A dialog displays in which you can enter the name of the new Fabric Assist. All names must be unique and contain no spaces.
Delete FA	Deletes the Fabric Assist selected in the FA Name field. Deleting a Fabric Assist automatically removes it from all aliases, zones, and zone configurations, including the associated AL_PAs.
Rename FA	Edits the name of the Fabric Assist selected in the FA Name field.
Member Selection List	Provides a list of members available to add to the Fabric Assist.
Add Host	Adds the selected item as a host to the [Fabric Assist name] Members list. Only a domain port or a WWN can be added as a host.
Add Member	Adds the member selected in the Member Selection List to the [Fabric Assist name] Members list.
Remove Member	Removes the selected member from the [Fabric Assist name] Members list.
Add Other	Adds the member selected in the Member Selection List to the [Fabric Assist name] Members list. Click to add an unlisted domain port or WWN.
Add Other Host	Adds a host to the [Fabric Assist name] Members list. Click to add an unlisted domain port or WWN. Click to add an unlisted domain port or WWN as a host.

Table 3-10 Fabric Assist Tab Fields (*continued*)

[Fabric Assist name] Members	Provides a list of the members that belong to the Fabric Assist currently selected in the FA Name field. The name of this list depends on the name of the Fabric Assist selected. If no Fabric Assist is selected, the name displays as null Members.
Apply	Applies all changes made since the Zone Administration View was opened, including changes made on other tabs in the view. Changes cannot be cancelled once they are applied.
Cancel	Cancels all changes since the changes were last applied and to exit Zone Administration. Changes cannot be cancelled once they are applied.
Done	Applies all changes made since the Zone Administration View was opened and to exit the Zone Administration View.

Config Tab

You use the Config tab (Figure 3-11) to create and manage zone configurations. Zone configurations allow you to enable or disable a group of zones simultaneously. Only one zone configuration can be enabled on a fabric at one time.

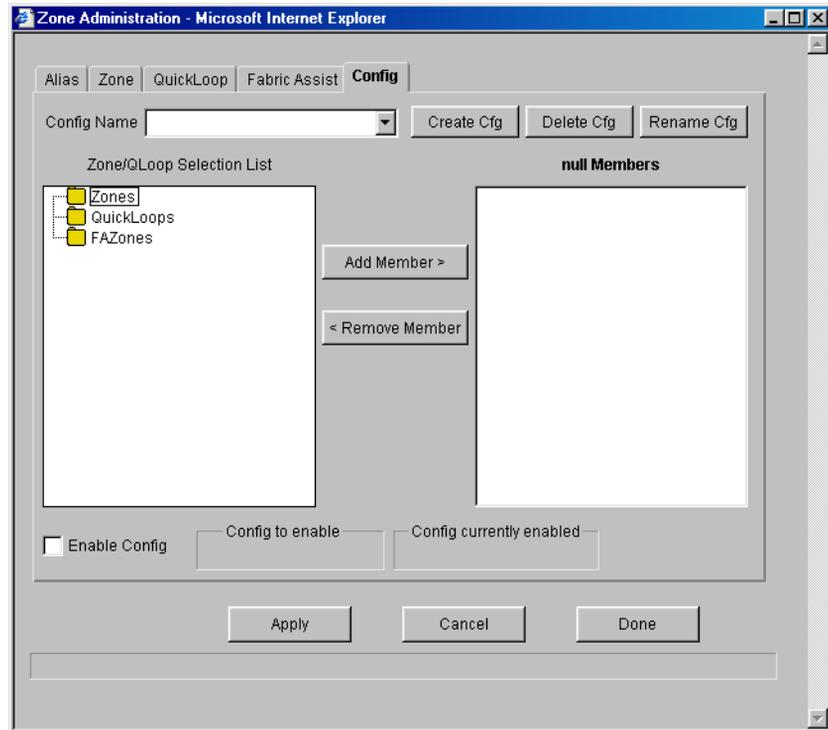


Figure 3-11 Config Tab — Zone Administration View

Table 3-11 describes the fields on the Config tab.

Table 3-11 Config Tab Fields

Field	Description
Config Name	Modifies an existing configuration, select a configuration name.
Create Cfg	Creates a new configuration. A dialog displays in which you can enter the name of the new configuration. All names must be unique and contain no spaces or dash "-" characters.

Table 3-11 Config Tab Fields (*continued*)

Delete Cfg	Deletes the configuration selected in the Config Name field.
Rename Cfg	Renames of the configuration selected in the Config Name field.
Zone/QLoop Selection List	Provides a list of the zones and QuickLoops available to add to the configuration.
Add Member	Adds the switch selected in the Zone/QLoop Selection List to the Configuration Members list.
Remove Member	Removes the selected member from the [Configuration name] Members list.
[Configuration name] Members	The members of the configuration selected in the Config Name field. The name of this list depends on the selection. Only one configuration can be enabled at a time; if none are enabled, zoning is not active in the fabric.
Enable Config	Enables the configuration selected in the Config Name field, or uncheck to disable it.
Config to enable	Displays the name of the configuration that is currently selected for enabling. This configuration can be enabled by clicking Apply.
Config currently enabled	Displays the name of the currently enabled configuration. Only one configuration can be enabled at a time.
Apply	Applies all changes made since the Zone Administration View was opened, including changes made on other tabs in the view. Changes cannot be cancelled once they are applied.
Cancel	Cancels all changes since they were last applied and to exit the Zone Administration View. Changes cannot be cancelled once applied.
Done	Applies all changes made since the Zone Administration View was opened and to exit the Zone Administration View.

Switch View

The Switch View represents the front panel of the switch, and displays when you click a Switch icon in Fabric View. This view provides information about the overall status of the switch and the status of the individual elements in the switch. The information displayed is as close as possible to a real-time view of switch status. If the switch is not functioning properly, a message explains the problem detected.

Switch status is stored as the variable *switchStatus*, and is calculated approximately once per second; however the initial calculation does not occur until 30-60 seconds after the switch is booted.

To access Switch View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

```
http://switch name/
```

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click the **Switch** icon. The Switch View (Figure 3-12) displays.

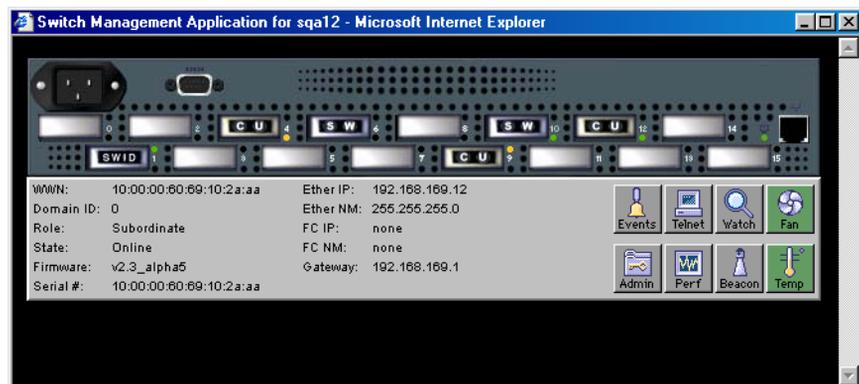


Figure 3-12 Switch View

Table 3-12 describes the items and information available in Switch View.

Table 3-12 Switch View

Port icons	<p>The letters in the Port icon indicate the GBIC (Gigabit Interface Converter) type, as follows:</p> <ul style="list-style-type: none"> blank – No GBIC present. SW – Short wave GBIC LW – Long wave GBIC CU – Copper GBIC SWID – Short wave serial ID GBIC LWID – Long wave serial ID GBIC CUID – Copper serial ID GBIC <p>A yellow outline around a port icon indicates port failure. For detailed port information, click the Port icon to see the Port Information View.</p>
Port numbers (on the right of each port)	The number of the port.
LED Status Indicators (round light next to each port)	<p>The color indicates the status of the port:</p> <ul style="list-style-type: none"> • No light — No device attached • Steady yellow — Receiving light, but not online; check cable connections • Slowly flashing yellow — Disabled (diagnostics or portDisable command). • Rapidly flashing yellow— Error, fault with port • Steady green — Online (connected with device by cable) • Slowly flashing green — Online but segmented (loopback cable or incompatible switch) • Rapidly flashing green — Internal loopback (diagnostic) • Flickering green — Online and transmitting/receiving frames
Power supply	<p>Removable power assemblies are updated to show presence/absence and status of each:</p> <ul style="list-style-type: none"> • Green — Power supply present and operational. • Red X — Power supply present but not operational. • Cover plate — Power supply absent or not fully plugged in.
Events	Accesses Switch Events View
Telnet	Launches a Telnet session

Table 3-12 Switch View (*continued*)

Fabric Watch (optional software)	Accesses Fabric Watch
Fan	The background color of the button indicates the overall status of the fans: <ul style="list-style-type: none"> • Green — Healthy • Yellow — Marginal (mix of good and faulty readings) • Red — Down (more than two faulty readings) • Gray — Unknown or unmonitored
Admin	Displays the Administrative Interface where you can perform switch management functions.
Perf	Displays the Performance View where you can monitor switch performance.
Beacon	Turns on the beaconing function. If on, this icon shows beams of light. The beaconing function helps to physically locate a switch by sending a signal to the specified switch, resulting in an LED light pattern flashing from side to side on the switch.
Temp	Displays temperature readings from all switch thermo sensors. The background color of the button indicates the overall temperature status: <ul style="list-style-type: none"> • Green — Healthy • Yellow — Marginal (mix of good and faulty readings) • Red — Down (more than two faulty readings) • Gray — Unknown or unmonitored
WWN	Displays the unique numeric identifier for each switch; assigned by manufacturer.
Domain ID	Displays the unique numeric identifier for each switch in a fabric.
Role	Indicates the current role of the switch: <ul style="list-style-type: none"> • Principal — The principal switch as defined by FC_SW protocol. • Subordinate — Enabled but not the principal switch. • Disabled — Disabled.

Table 3-12 Switch View (*continued*)

State	Indicates the current state of the switch: <ul style="list-style-type: none">• online• offline• testing• faulty
Firmware	Fabric OS version.
Serial #	The serial number of the switch being viewed.
Ether IP	Ethernet IP address.
Ether NM	Ethernet netmask value.
FC IP	Fibre channel IP address.
FC NM	Fibre channel netmask value.
Gateway	IP address of default gateway. Must be properly set to access switch from other networks.

Switch Events View

The Switch Events View displays a running log of events for the selected switch.

To access Switch Events View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

```
http://switch name/
```

Web Tools launches, displaying Fabric View.

3. Click the **Switch** icon. The Switch View (Figure 3-12) displays.
4. Click the **Events** icon.

The Switch Events View (Figure 3-13) displays.

Switch	Num...	Time	Count	Level	Message
sq12	21	Sep 28 14:31:27	1	4	0x10e67240 (tThad) FW-CHANGED fabricFR000 (Fabric Reconfigu...
sq12	20	Sep 28 14:21:44	1	4	0x10e67240 (tThad) FW-CHANGED fabricFR000 (Fabric Reconfigu...
sq12	19	Sep 28 14:21:44	1	4	0x10e67240 (tThad) FW-CHANGED fabricED000 (Fabric E-port do...
sq12	18	Sep 28 11:42:20	1	3	0x10e67240 (tThad) FW-BELOW eportState010 (E Port State Chan...
sq12	17	Sep 28 11:42:20	1	3	0x10e67240 (tThad) FW-BELOW eportState004 (E Port State Chan...
sq12	16	Sep 28 11:42:20	1	3	0x10e67240 (tThad) FW-BELOW eportState001 (E Port State Chan...
sq12	15	Sep 28 11:42:20	1	3	0x10e67240 (tThad) FW-BELOW eportLink010 (E Port Link Failures...
sq12	14	Sep 28 11:42:20	1	3	0x10e67240 (tThad) FW-BELOW eportLink004 (E Port Link Failures...
sq12	13	Sep 28 11:42:20	1	3	0x10e67240 (tThad) FW-BELOW eportLink001 (E Port Link Failures...
sq12	12	Sep 28 11:41:17	1	3	0x10e67240 (tThad) FW-ABOVE eportState010 (E Port State Chang...
sq12	11	Sep 28 11:41:17	1	3	0x10e67240 (tThad) FW-ABOVE eportState004 (E Port State Chang...
sq12	10	Sep 28 11:41:17	1	3	0x10e67240 (tThad) FW-ABOVE eportState001 (E Port State Chang...
sq12	9	Sep 28 11:41:17	1	3	0x10e67240 (tThad) FW-ABOVE eportLink010 (E Port Link Failures ...
sq12	8	Sep 28 11:41:17	1	3	0x10e67240 (tThad) FW-ABOVE eportLink004 (E Port Link Failures ...
sq12	7	Sep 28 11:41:17	1	3	0x10e67240 (tThad) FW-ABOVE eportLink001 (E Port Link Failures ...
sq12	6	Sep 28 11:41:17	1	4	0x10e67240 (tThad) FW-CHANGED fabricFL000 (Fabric Fabric logi...
sq12	5	Sep 28 11:41:17	1	4	0x10e67240 (tThad) FW-CHANGED fabricZC000 (Fabric Zoning ch...

Warning: Applet Window

Figure 3-13 Switch Events View

To sort the events by a particular column, click the column header. To resize a column, drag the column divider.

Table 3-13 lists available columns in Switch Events View.

Table 3-13 Switch Events

Field	Description
Switch	Name of switch
Num...	Event number
Time	Time of event
Count	Number of back-to-back occurrences of same event
Level	Severity level of event: 0 panic (switch reboots) 1 critical 2 error 3 warning 4 information 5 debug
Message	Description of event

Port Information View

The Port Information View displays statistics for the selected port. This information is automatically updated when the view is opened, and is also refreshed periodically while the view remains open.

To access Port Information View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

```
http://switch name/
```

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click the **Switch** icon in Fabric View to display the Switch View.
4. Click a **Port** icon. The Port Information View (Figure 3-14) displays.

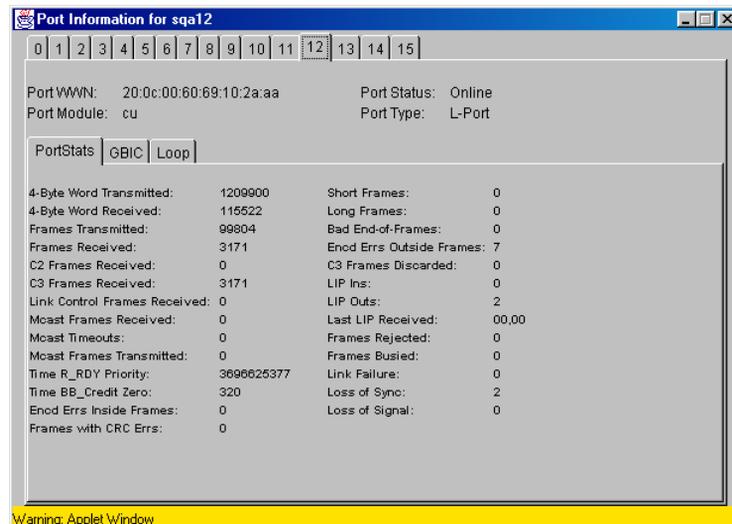


Figure 3-14 Port Information View

The following tabs are available in Port Information View and are described on the listed pages:

- ◆ *PortStats Tab* on page 3-38
- ◆ *GBIC Tab* on page 3-40
- ◆ *Loop Tab* on page 3-43

Table 3-14 describes the fields that are always visible in Port Information View whenever a tab is selected.

Table 3-14 Port Information Fields

Field	Description
Port World Wide Name	World Wide Name (WWN) of this port.
Port Module	The GBIC type, as follows: -- — No GBIC present SW — Short wave GBIC LW — Long wave GBIC CU — Copper GBIC SWID — Short wave serial ID GBIC LWID — Long wave serial ID GBIC CUID — Copper serial ID GBIC
Port Status	The current status of the port: No_Module — No GBIC module is in this port. No_Light — Module is not receiving light. No_Sync — Module is receiving light but out of sync. In_Sync — Module is receiving light and in sync. Laser_Flt — Module signaling a laser fault (defective GBIC). Port_Flt — Port is marked faulty (defective GBIC, cable, or device). Diag_Flt — Port failed diagnostics. Online — Port is up and running. Lock_Ref — Port is locking to reference signal. (<i>continued on next page</i>)

Table 3-14 Port Information Fields (*continued*)

Port Status (<i>continued</i>)	Removing a cable from an E_Port temporarily generates errors, causing the status to show as faulty. The status returns to healthy when the sample interval has passed (the default interval is 1 minute).
Port Type	The type of port: E_Port — Switch link port G_Port — Generic port U_Port — Universal port F_Port — Fabric port FL_Port — Fabric loop port L_Port — Loop port

PortStats Tab

The PortStats tab provides information about transmission speed, reception speed, and the volume of traffic through the selected port.

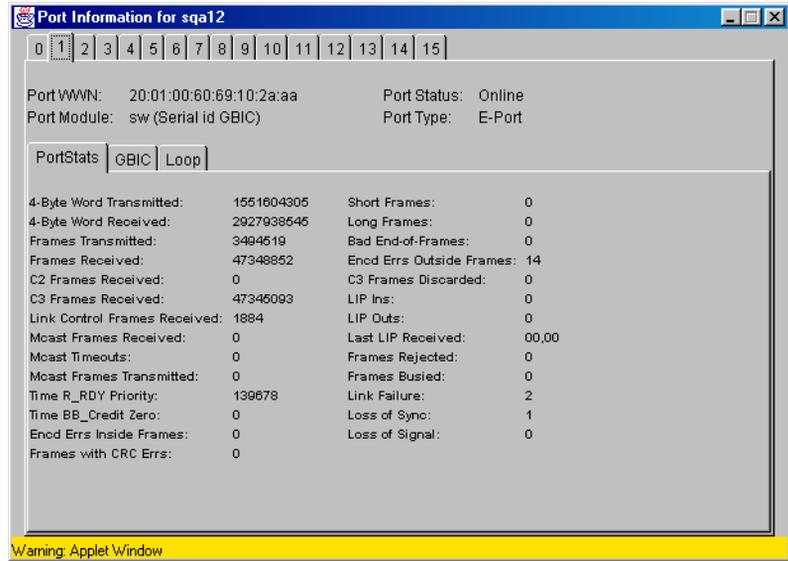


Figure 3-15 PortStats Tab — Port Information View

Table 3-15 describes the fields on the PortStats tab:

Table 3-15 PortStats Tab Fields

Field	Number of ...
4-Byte Word Transmitted	Four-byte words transmitted.
4-Byte Word Received	Four-byte words received.
Frames Transmitted	Frames transmitted.
Frames Received	Frames received.
C2 Frames Received	Class 2 frames received.
C3 Frames Received	Class 3 frames received.
Link Control Frames Received	Link control frames received.

Table 3-15 PortStats Tab Fields (*continued*)

Mcast Frames Received	Multicast frames received.
Mcast Time-outs	Multicast timeouts.
Mcast Frames Transmitted	Multicast frames transmitted.
Time R_RDY Priority	Times R_RDY has priority over frames to be sent.
Time BB_Credit Zero	Times BB_Credit went to zero.
Encd Errs Inside Frames	Encoding errors inside frames.
Frames with CRC Errs	Frames with CRC errors.
Short Frames	Frames shorter than minimum.
Long Frames	Frames longer than maximum.
Bad End-of-Frames	Frames with faulty end-of-frames.
Encd Errs Outside Frames	Frames with encoding errors outside frames.
C3 Frames Discarded	Class 3 frames discarded.
LIP Ins	LIPs received.
LIP Outs	Times loop initialized by FL_Port.
Last LIP Received	Last LIP received: AL_PD, AL_PS.
Frames Rejected	F_RJTs sent.
Frames Busied	F_BSYs sent.
Link Failure	Times NOS received/sent.
Loss of Sync	Times loss of sync occurred.
Loss of Signal	Times loss of signal occurred.

GBIC Tab

The GBIC tab provides information about the GBIC (Gigabit Interface Converter) installed in the selected port. The information displayed depends on the type of GBIC installed:

Standard GBIC	Module type (short wave, long wave, copper, etc.).
Serial ID GBIC	Module type, plus extended information about capabilities, interfaces, and manufacturer.
Smart Finisar GBIC	All of the above information, plus GBIC active status.

If the port does not contain a GBIC, the following information displays:

Not a serial ID GBIC. No GBIC info available.

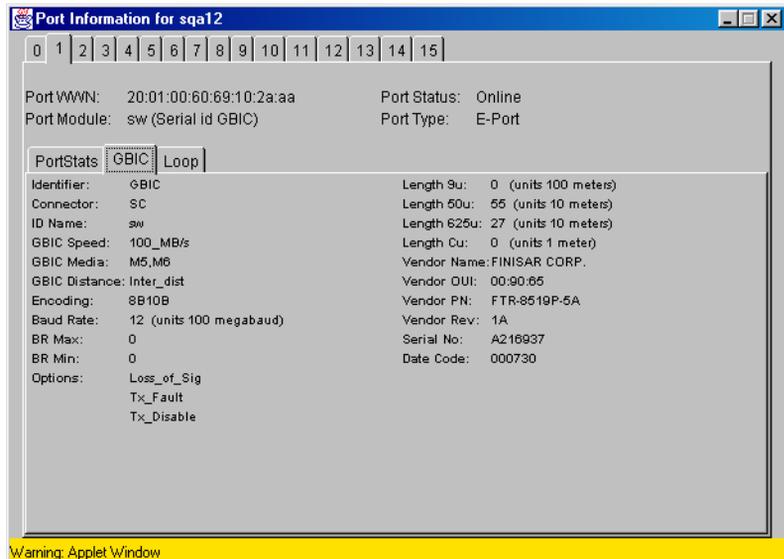


Figure 3-16 GBIC Tab — Port Information View

Table 3-16 describes the fields on the GBIC tab:

Table 3-16 GBIC Tab Fields

Field	Description
Identifier	Indicates the type of serial transceiver, which can be GBIC or on-board.
Connector	Indicates the external connector type, which can be one of the following: SC Style-1 Copper Style-2 Copper BNC/TNC Coaxial
ID Name	Indicates the GBIC module type: -- — No GBIC present sw — Short wave GBIC lw — Long wave GBIC c — Copper GBIC swid — Short wave serial ID GBIC lwid — Long wave serial ID GBIC cuid — Copper serial ID GBIC
GBIC Speed	Indicates the GBIC speed, which can be 100, 200, or 400 MB/sec.
GBIC Media	Indicates the transmission media, which can be: SM — single mode M5 — multimode, 50u M6 — multimode, 62.5u TV — video coax MI — miniature coax TP — shielded twisted pair TW — twin axial pair
GBIC Distance	Indicates the length of the fibre channel link, which can be long distance, intermediate distance, or short distance.
Encoding	Indicates the serial encoding mechanism, which can be 8B10B, 4B5B, NRZ, or Manchester.
Baud Rate	Nominal baud rate in units of 100 Megabyte.
BR Max	Upper limit at which GBIC meets its specifications (in units of 1 percent above nominal baud rate).

Table 3-16 GBIC Tab Fields (*continued*)

BR Min	Lower limit at which GBIC meets its specifications (in units of 1 percent below nominal baud rate).
Options	May indicate any of the following: Loss of Signal Loss of Signal Inverted Transmission Fault Transmission Disable
Length 9u	Length of link using single mode fibre.
Length 50u	Length of link using 50um multimode fibre.
Length 625u	Length of link using 62.5um multimode fibre.
Length Cu	Minimum length of link using copper cable.
Vendor Name	Name of vendor.
Vendor OUI	Unique identifier for vendor.
Vendor P/N	Vendor part number.
Vendor Rev	Vendor revision number.
Serial No.	Vendor serial number.
Date Code	Vendor date code.
Smart GBIC Data (only displays if a smart GBIC is present):	
Temperature	Module temperature (in Centigrade).
Rx Power	Received optical power in micro Watts.
Tx Power	Transmitted optical power in micro Watts (long wave only).
Current	Laser diode drive current in mAmps.

Loop Tab

The Loop tab (Figure 3-17) provides information about any loop on the port, including the following:

- ◆ Loop statistics
- ◆ Local AL_PA statistics
- ◆ QuickLoop looplet statistics (if the port is a member of the QuickLoop)
- ◆ QuickLoop statistics (if the port is a member of the QuickLoop)

If the port is not a loop-enabled port, the following information displays:

Not an L_Port. No loop info available.

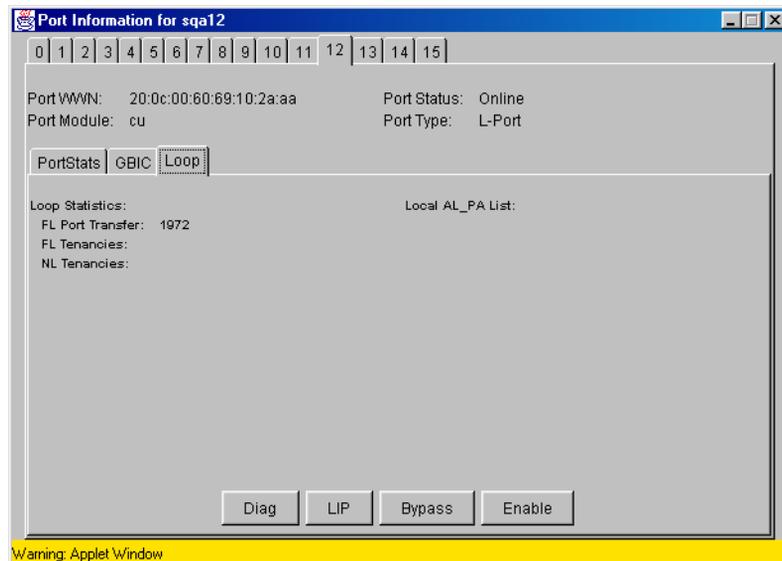


Figure 3-17 Loop Tab — Port Information View

Table 3-17 describes the fields on the Loop tab:

Table 3-17 Loop Fields

Field	Displays the ...
FL Port Transfer	Number of times FL_Port used transfer state.
FL Tenancies	Number of times FL_Port opens loop tenancy.

Table 3-17 Loop Fields (*continued*)

NL Tenancies	Number of times NL_Port opens loop tenancy.
Number of QL/Zone Inits Caused	Number of times looplet has caused QuickLoop to be initialized.
Number of Successful QL/Zones Inits	Number of times looplet has successfully initialized.
Number of Failed QL/Zone Inits	Number of times looplet failed to successfully initialize.
Number of Times Being Bypassed	Number of times looplet was not included as part of QuickLoop.
Last Time bypassed	Time that looplet was last bypassed.
Local AL_PA List	List of AL_PAs associated with devices connected to loop.
Number of QL Init Attempts	Number of times QuickLoop attempted initialization.
Number of Successful QL Inits	Number of times QuickLoop successfully initialized.
Number of Times in Single Switch Mode	Number of times switch reverted to single switch mode.
Number of Times in Dual Switch Mode	Number of times switch operated in dual switch mode.
Time of Last QL Init	Time of latest QuickLoop initialization.
Switch, Port Caused the Last Init	Displays number of switch, port that caused the latest initialization.
Diag	Loop Diagnostics dialog box, which enables you to run loop diagnostics (requires password). For more information, see <i>Loop Diagnostics Dialog Box</i> on page 3-45.

Table 3-17 Loop Fields (*continued*)

LIP	LIP dialog box, which enables you to initialize the loop (requires password). For more information, see <i>LIP Dialog Box</i> on page 3-46.
Bypass	Bypass dialog box, which enables you to bypass a specified looplet (requires password). For more information, see <i>Bypass Dialog Box</i> on page 3-46.
Enable	Enable dialog box, which enables you to enable an AL_PA on a specified looplet (requires password). For more information, see <i>Enable Dialog Box</i> on page 3-47.

Loop Diagnostics Dialog Box

This dialog box displays when you click DIAG on the Loop tab of the Port Information View. You use the Loop Diagnostics option to identify faulty devices on a loop.

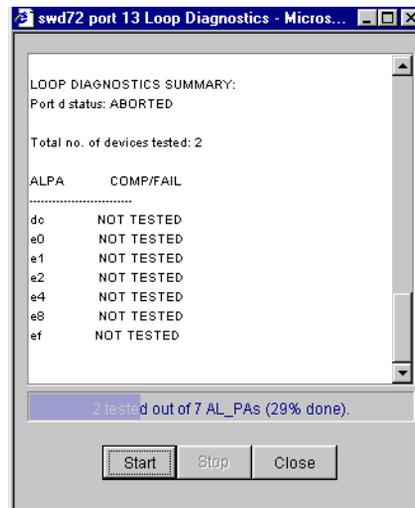


Figure 3-18 Loop Diagnostics Dialog Box

Table 3-18 describes the fields in the Loop Diagnostics dialog box

Table 3-18 Loop Diagnostics Fields

Field	Description
Start	Starts the Loop Diagnostics on the specified port.
Stop	Stops (abort) Loop Diagnostics on the specified port.
Close	Closes the Loop Diagnostics function.

LIP Dialog Box You can use the LIP (Loop Initialization Process) option to initialize a loop port. To access this option, click **LIP** on the Loop tab of the Port Information View.



Figure 3-19 LIP Dialog Box

Table 3-19 describes the fields in the LIP dialog box.

Table 3-19 LIP Fields

Field	Description
Apply	Initializes a loop port.
Close	Closes the LIP dialog box.

Bypass Dialog Box You can use the Bypass option to bypass an AL_PA (a device) on the loop port. To access this option, from **Performance Information View**, click **Bypass** on the **Loop** tab.



Figure 3-20 Bypass Dialog Box

Table 3-20 describes the fields in the Bypass dialog box.

Table 3-20 Bypass Fields

Field	Description
AL_PA to Bypass	Specifies the AL_PA number to bypass. Do not bypass the last AL_PA on the loop, as this will put it into a loopback state, requiring a reboot to return it to an L-Port state.
Apply	Bypasses an AL_PA on the loop port (must be a valid AL_PA).
Close	Closes the Bypass dialog box.

Enable Dialog Box You can use the Enable option to enable an AL_PA on the loop port that was previously bypassed. To access this option, from **Port Information View**, click **Enable** on the **Loop** tab.



Figure 3-21 Enable Dialog Box

Table 3-21 describes the fields in the Enable dialog box.

Table 3-21 Enable Fields

Field	Description
AL_PA to Enable	Specifies AL_PA to be enabled. Entering <code>0xff</code> enables all the AL_PAs in the loop.
Apply	Enables the AL_PA (must be valid AL_PA).
Close	Closes an AL_PA window.

Fabric Watch View

You use Fabric Watch View to monitor fabric elements for potential problem conditions. For detailed information about Fabric Watch, see the *Departmental Switch Model DS-16B Fabric Watch User Guide*.

To access Fabric Watch View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**.

```
http://switch name/
```

Web Tools launches, displaying Fabric View.

3. Click the **Switch** icon.

The Switch View displays.

4. Click the **Watch** icon.

The Fabric Watch View displays, with the Alarm Notifications tab (described in the following section) selected by default.

Fabric Watch View contains the following tabs:

- Alarm Notifications
- Configure Thresholds
- Current Settings

In addition, an organizational tree appears on the left, showing all the Fabric Watch areas regardless of which tab is selected. To expand or contract a folder in the tree, double-click the folder.

Alarm Notifications Tab

You can use the Alarm Notifications tab (Figure 3-22) to view and customize the Fabric Watch notifications. You can either accept the default notifications or select the Custom option and specify the type of notification (Syslog, SNMP_Traps, or Port log lock) for each type of event.

The screenshot shows the 'Alarm Notifications' tab in the Fabric Watch web interface. The left sidebar contains a tree view with 'Environment' selected. The main content area displays a table of alarm notifications.

Name	State	Reason	Old Value	New Value	Time
envTemp001	Normal	InBetween	28	28	11:41:17 on 09/28/2000
envTemp002	Normal	InBetween	30	30	11:41:17 on 09/28/2000
envTemp003	Normal	InBetween	27	27	11:41:17 on 09/28/2000
envTemp004	Normal	InBetween	32	32	11:41:17 on 09/28/2000
envTemp005	Normal	InBetween	31	31	11:41:17 on 09/28/2000
envFan001	Normal	Above	5430	5400	11:41:17 on 09/28/2000
envFan002	Normal	Above	5460	5460	11:41:17 on 09/28/2000
envFan003	Normal	Above	5340	5370	11:41:17 on 09/28/2000

Figure 3-22 Alarm Notifications Tab — Fabric Watch View

Configure Thresholds

You can use the Configure Thresholds tab to view and configure Fabric Watch thresholds for the Fabric Watch class currently selected in the organizational tree on the left side of the window.

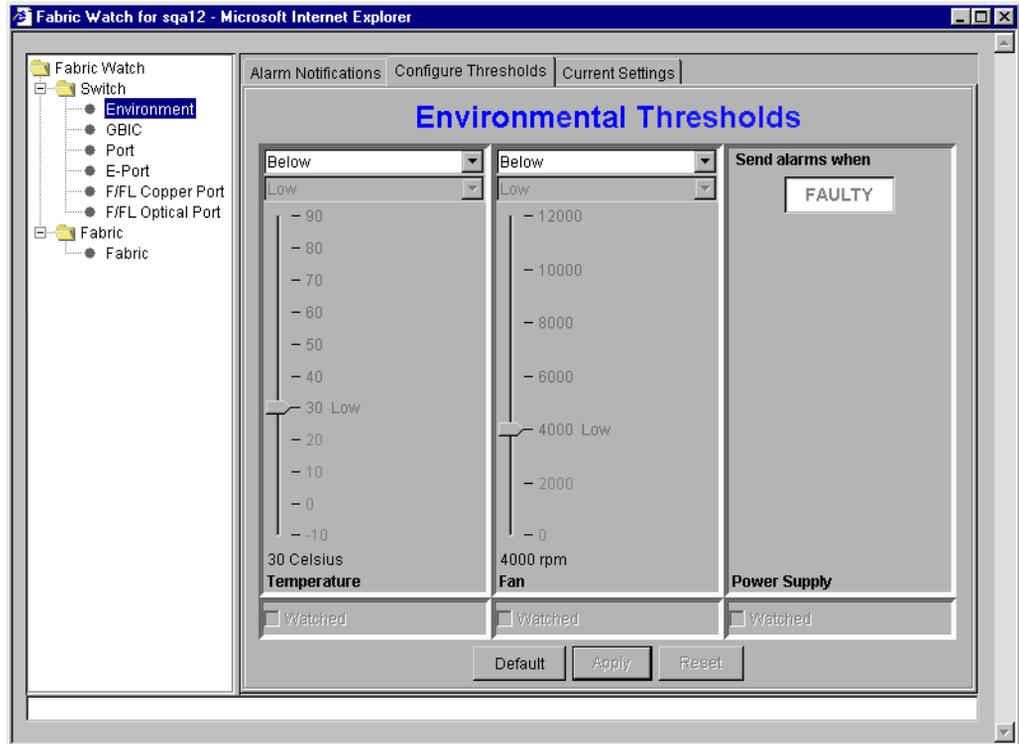


Figure 3-23 Configure Threshold Tab with Environment Class Selected

The Configure Threshold display changes according to the class and area selected in the organizational tree. However, the Configure Thresholds tab always contains the following buttons:

- Default** Returns settings to default values.
- Apply** Applies the values specified in the current display. When you click **Apply** after a change, the Alarm Mechanism dialog box displays:



- Reset** To continue, select the type of alarm you want and click **Apply**. Restores the last changes that were applied.

Thresholds for the Environmental and GBIC Classes

The Environmental and GBIC classes both display a separate column for each area (see Figure 3-23).

Table 3-22 Environmental and GBIC Classes Thresholds

Threshold	Description
The columns for the <i>Temperature</i> , <i>Fan</i> , <i>RX Power</i> , and <i>TX Power</i> areas contain the following items:	
Threshold Type drop-down list	Selects the threshold type (outranged, above, in-between, below, changed).
High/Low drop-down list	Selects to enter the high and low settings for the threshold type selected in the Threshold Type drop-down list (not available for all areas).
Scale	Specifies the point at which you want to set the specified threshold.
Area drop-down list	Selects a Fabric Watch area.

Table 3-22 Environmental and GBIC Classes Thresholds (*continued*)

Watched checkbox	Checks or unchecks to specify whether you want this area watched (not available for all areas).
The column for the <i>Power Supply</i> and <i>Current</i> areas contain the following item:	
"Send alarms when" box	Specifies whether you want to be notified when the area is in the acceptable range (OK) or is faulty (FAULTY).

Thresholds for the Remaining Classes

The Port, E_Port, F/FL Copper Port, F/FL Optical Port classes display the following fields for each area (Link Loss, Sync Loss, Signal Loss, Protol Error, Invalid Words, Invalid CRCs, State Changes, RX Performance, TX Performance):

Table 3-23 Additional Port Class Thresholds

Threshold	Description
Low text box	Enters the lowest number of occurrences that are acceptable.
High text box	Enters the highest number of occurrences that are acceptable.
Threshold Type drop-down list	Selects the type of threshold.
Time period drop-down list	Selects the time period you want applied to frequency measurements.

Figure 3-24 displays the thresholds for the Port class.

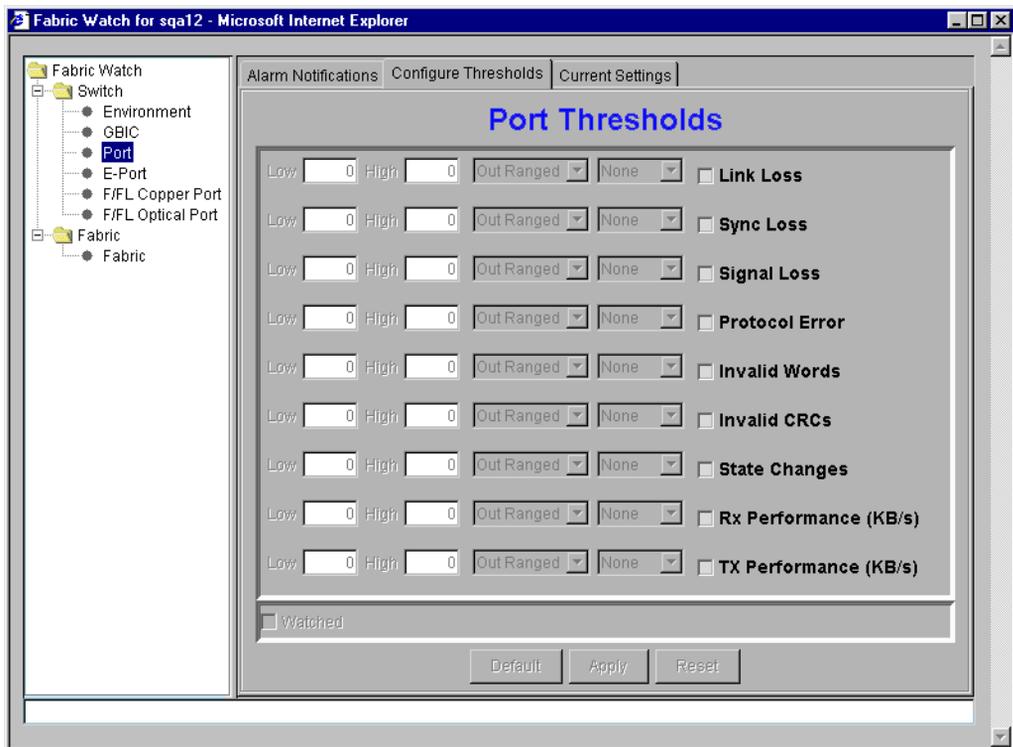


Figure 3-24 Configure Threshold Tab with Port Class Selected

Current Settings Tab

The Current Settings tab (Figure 3-25) enables you to view the current Fabric Watch threshold parameters for the area selected in the Fabric Watch tree.

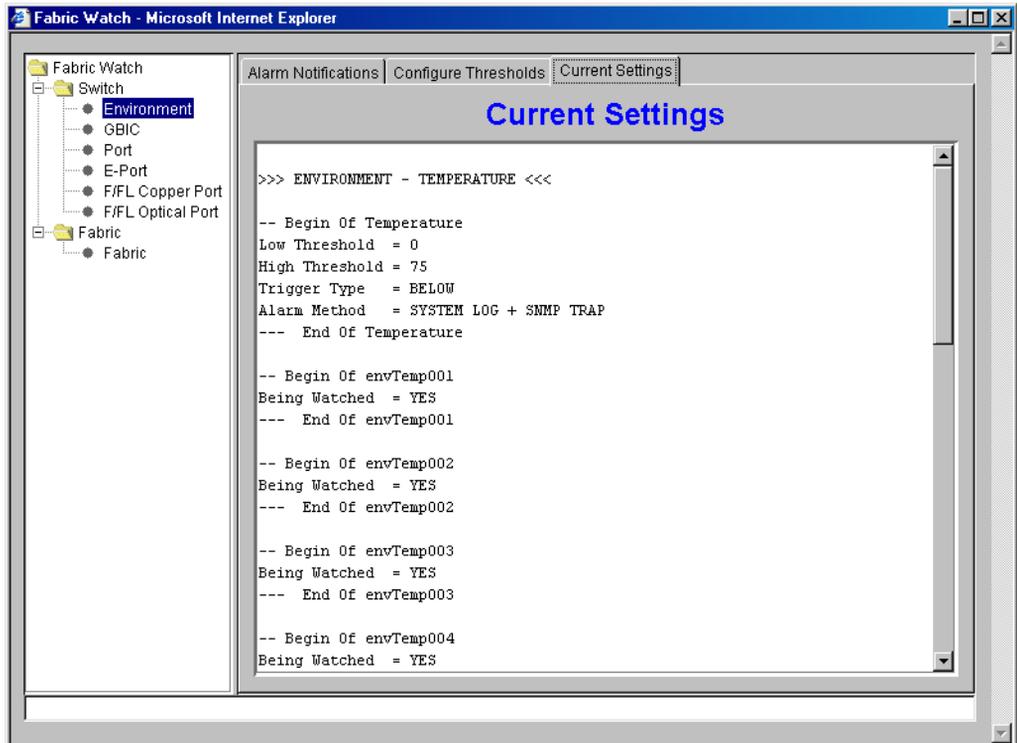


Figure 3-25 Current Settings Tab — Fabric Watch View

Performance View

The Performance View graphically displays throughput (megabytes per second) for each port and also for the entire switch.

- ◆ Port throughput is the number of bytes received at a port plus the number of bytes transmitted.
- ◆ Switch throughput is the sum of the throughput for all the ports.

To access Performance View:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

```
http://switch name/
```

Web Tools launches, displaying Fabric View (Figure 3-2).

3. Click the **Switch** icon. The Switch View (Figure 3-12) displays.
4. Click the **Performance** icon. The Performance View displays.

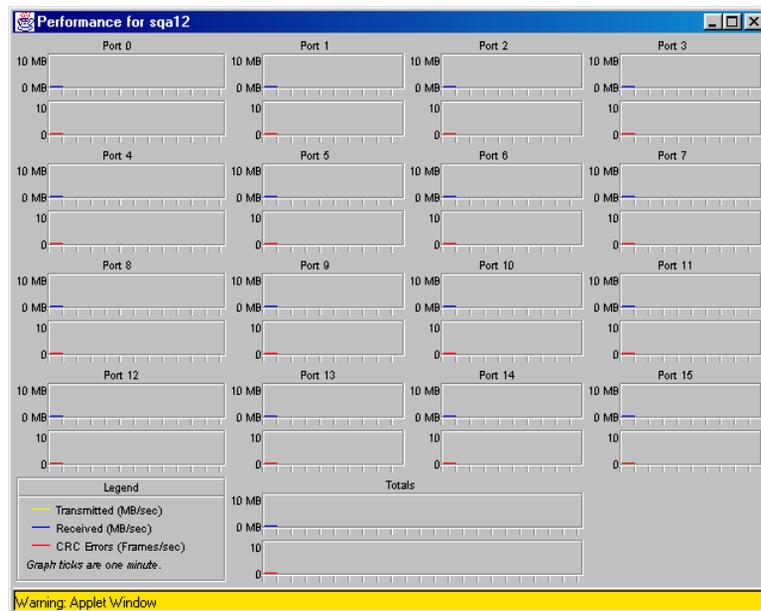


Figure 3-26 Performance View

In addition to the port graphs, a graph for the entire switch is provided at the bottom of the window. Resizing the window changes the size and shape of all the individual graphs.

In both the port and switch graphs, the horizontal axis represents elapsed time and the vertical axis represents throughput. By default the port graph contains approximately 10 minutes worth of data and the switch graph contains approximately 20 minutes of data.

Administrative Interface

◆ Administrative Interface	4-2
◆ Switch Administration	4-4
◆ User Administration	4-7
◆ SNMP Administration	4-11
◆ License Administration	4-13
◆ Remote Switch	4-14
◆ QuickLoop Administration	4-16
◆ Config Admin Tab	4-18
◆ Extended Fabric Tab (Optional Software)	4-21
◆ Telnet Interface	4-23

Administrative Interface

The Administrative Interface consists of the functions below. To access the functions, from **Switch View**, click **admin**. The first function to display is Switch Administration.

- ◆ Switch Administration
- ◆ User Administration
- ◆ Firmware Upgrade
- ◆ Reboot Switch
- ◆ SNMP Administration
- ◆ License Administration
- ◆ Remote Switch
- ◆ QuickLoop Administration
- ◆ Configuration Administration
- ◆ Extended Fabric

You access all other Administrative Interface functions by clicking the appropriate tab from any function.

You must have administrative privileges to access these functions. Once an administrative login is entered, administrative privileges remain available until the web browser is exited.

To access the Administrative Interface:

1. Launch the web browser.
2. Enter the switch name or IP address in the **Location/Address** field and press **Enter**. For example:

```
http://switch name/
```

Web Tools launches, displaying Fabric View.

3. Click the **Admin** icon on the switch panel.

The Enter Network Password dialog displays.



Figure 4-1 Enter Network Password

4. Enter your user name and password. The logon account must have administrative privileges.
5. Click **OK**.

The Administrative Interface displays, with the Switch Admin tab selected by default.

The sections that follow describe each function detail.

Switch Administration

Use Switch Administration to change IP information, disable a switch, change the domain, change the switch name, or to see which ports are disabled.

To access Switch Administration, click **admin** from the Switch View. You can also click the **Switch Admin** tab from any Administration function.

The screenshot shows the 'Switch Admin' web interface for switch 'sqa12'. The interface includes a navigation menu with tabs: Switch Admin, User Admin, Firmware Upgrade, Reboot Switch, SNMP Admin, License Admin, Remote Switch, QuickLoop Admin, Config Admin, and Extended Fabric. The main configuration area is divided into several sections:

- Switch Information:** Switch Name: sqa12, Domain ID: 5, Extended Fabric: , Switch Disabled:
- Network Configuration:**
 - Ethernet IP: 192.168.169.12, Ethernet Subnetmask: 255.255.255.0
 - Fibre Channel IP: none, Fibre Channel Subnetmask: none
 - Gateway IP: 192.168.169.1
 - Syslog Daemon IP(s):

For multiple syslogd destinations (up to 6), use comma between IP addresses.
- Switch Port Configuration:**

Port No	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Port Disabled:	<input type="checkbox"/>															
- Buttons:** Commit Configuration Changes, Reset
- Caution:** Disabling the switch or its port(s) may cause interruption of service or loss of management access. Changing the domain id may cause a temporary interruption of service. A disabled switch or disabled port(s) are automatically reenabled by a reboot or fastboot.

Figure 4-2 Switch Administration

Table 4-1 describes the fields on the Switch Administration tab:

Table 4-1 Switch Administration Tab

Field	Description
Switch Name	Displays or sets the switch name. To change the switch name, enter new name in this field.
Domain ID	Displays or sets switch domain ID. Domain IDs must be unique within a fabric. To change domain ID, enter new domain ID in this field. Use a number from 1 to 239 for normal operating mode (FCSW compatible) and a number from 0 to 31 for VC encoded address format mode (backward compatible to 1000-series switches).
Extended Fabric	Allows ports to be configured for long distance, or uncheck to turn the option off.
Switch Disabled	Disables the switch, or uncheck to enable the switch.
Ethernet IP	Displays or sets IP address for Ethernet connection to switch.
Ethernet Subnetmask	Displays or sets Ethernet subnetmask. Default value is none. Contact network administrator for value to enter. If changed, restart browser.
Fibre Channel IP	Displays or sets fibre channel IP address.
Fibre Channel Subnetmask	Displays or sets fibre channel subnetmask. If changed, restart browser.
Gateway IP	Displays or sets gateway IP address. Contact network administrator for IP address. If changed, restart browser.
Syslog Daemon IP	Displays or sets destination station IP address for sending events using syslog protocol to host. Contact network administrator for IP address. If messages are not to be sent, enter none or leave blank. Maximum of six IP addresses. Enter multiple addresses as a list, for example 192.16864.35, 192.16862.36, etc.
Port No	Returns the Port number.

Table 4-1 Switch Administration Tab (*continued*)

Port Disabled	If the box is checked, disables the port.
Commit Configuration Changes	Applies changes made.
Reset	Resets all fields to values present when Switch Administration was launched.

User Administration

Use User Administration to rename accounts or change passwords.

To access User Administration, click the **User Admin** tab from any Administration function.

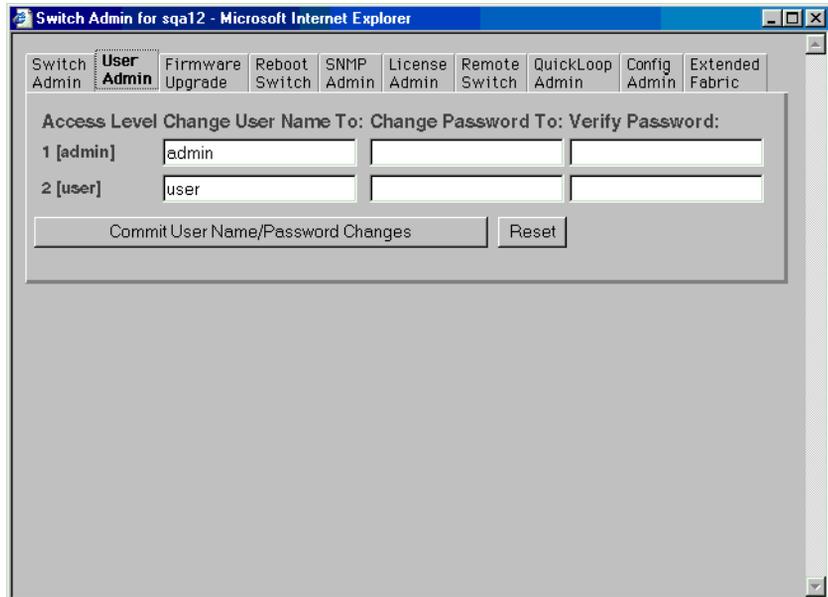


Figure 4-3 User Administration

Table 4-2 describes the fields on the User Administration tab:

Table 4-2 User Administration Fields

Field	Description
Access Level	Access level required - Admin or User.
Change User Name To	Enters new user name.
Change Password To	Enters new password.
Verify Password	Re-enter password to verify.
Commit User Name/Password Changes	Applies changes made.
Reset	Resets all fields to values set at last submission.

Firmware Upgrade

Use Firmware Upgrade to download firmware upgrades.

To access Firmware Upgrade, click the **Firmware Upgrade** tab from any Administration function.

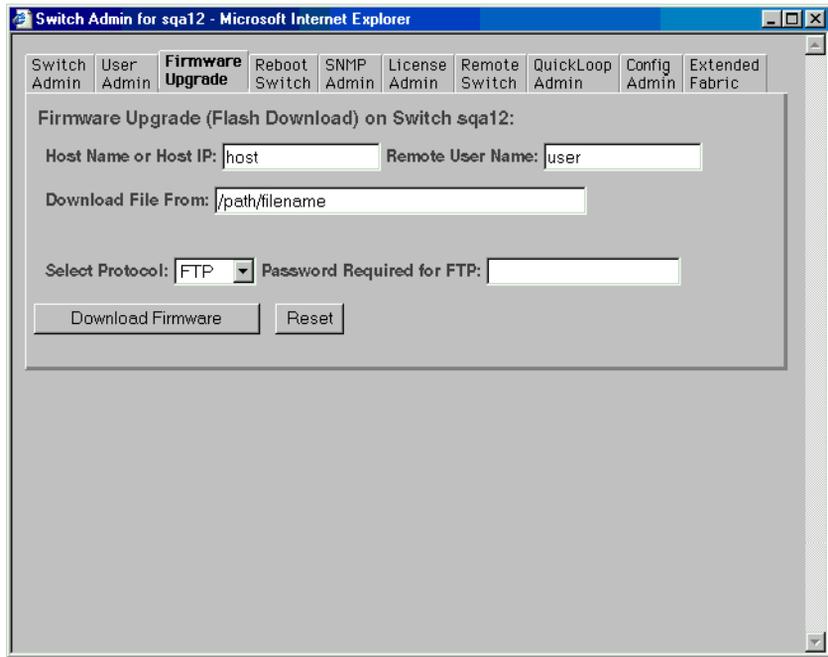


Figure 4-4 Firmware Upgrade

Table 4-3 describes the fields on the Firmware Upgrade tab:

Table 4-3 Firmware Upgrade Tab

Field	Description
Host Name or Host IP	Displays or sets host name or host IP address.
Remote User Name	Displays or sets remote user name.
Download File From	Displays or sets absolute directory path from source host where binary Fabric OS resides. (You must use forward slashes (/) when downloading Fabric OS in a Windows environment. In UNIX environment, path names cannot contain spaces, for example <code>\temp\ds-16b\ver_220.</code>)

Table 4-3 Firmware Upgrade Tab (*continued*)

Password Required for FTP	Enters a password if FTP was selected as the protocol. The rsdh daemon must be running if rsh is selected. When running a Windows host, you must manually start the rshd.exe utility, which is available from EMC Technical Support.
Download Firmware	Downloads firmware.
Reset	Resets all fields to values present when Firmware Upgrade was launched.

Reboot Switch

Use Reboot Switch to reboot or fast boot the switch. POST (Power On Self Test) can also be disabled for future reboots.

To access Reboot Switch, click the **Reboot Switch** tab from any Administration function.

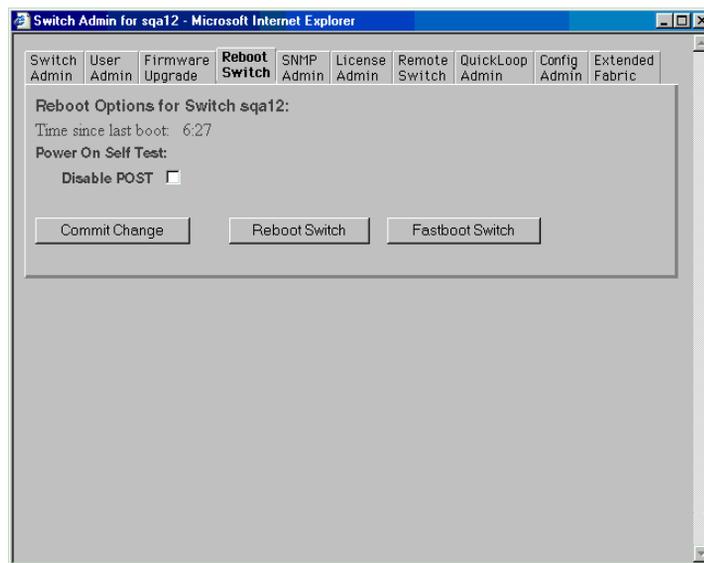


Figure 4-5 Reboot Switch

Table 4-4 describes the fields on the Reboot Switch tab:

Table 4-4 Reboot Switch Fields

Field	Description
Disable POST	Disables POST for future reboots; check it off to enable POST.
Commit Change	Saves settings.
Reboot Switch	Reboots the switch.
Fastboot Switch	Performs a fast reboot. A fastboot bypasses POST. (This is the same as a reboot with POST disabled.)

SNMP Administration

Use SNMP Administration to set SNMP options.

To access SNMP Administration, click the **SNMP Admin** tab from any Administration function.

Switch Admin for sqal2 - Microsoft Internet Explorer

Switch Admin | User Admin | Firmware Upgrade | Reboot Switch | **SNMP Admin** | License Admin | Remote Switch | QuickLoop Admin | Config Admin | Extended Fabric

System Name: sqal2 Ethernet IP: 192.168.169.12

SNMP System Configuration:

System Description:

System Location:

System Contact:

Event Trap Level (0-5): Enable Authentication Traps:

SNMP Community and Trap Recipient Configuration:

		Community String	Trap Recipient
Read Write	1	ttt	0.0.0.0
	2	OrigEquipMfr	0.0.0.0
	3	private	0.0.0.0
Read Only	4	public	192.168.13.240
	5	common	0.0.0.0
	6	FibreChannel	0.0.0.0

Figure 4-6 SNMP Administration

Table 4-5 describes the fields on the SNMP Administration tab:

Table 4-5 SNMP Administration Fields

Field	Description
System Description	Displays or sets system description. Default is Fibre Channel Switch.
System Location	Displays or sets location of switch. Default is End User Premise.
System Contact	Displays or sets contact information for switch. Default is Field Support.
Event Trap Level	Sets severity level of switch events that prompt SNMP traps. Default is 0.
Enable Authentication Traps	Enables authentication traps; click off to disable (recommended).
Read Write Community String	Displays or sets up to three strings that work with the SNMP <code>set</code> command.
Read Only Community String	Displays or sets up to three strings that work with the SNMP <code>get</code> or <code>get-next</code> command.
Read Write and Read Only Trap Recipients	Displays or sets recipients for traps (usually IP address of SNMP management station).
Commit SNMP Changes	Applies changes made.
Reset	Resets all fields to values present when SNMP Administration was launched.
To disable the community string or trap recipient fields, leave them empty.	

License Administration

Use License Administration to add or remove licenses. This tab displays a list of installed license keys and features. To access License Administration, click the **License Admin** tab from any Administration function.

All license keys are installed at the factory.

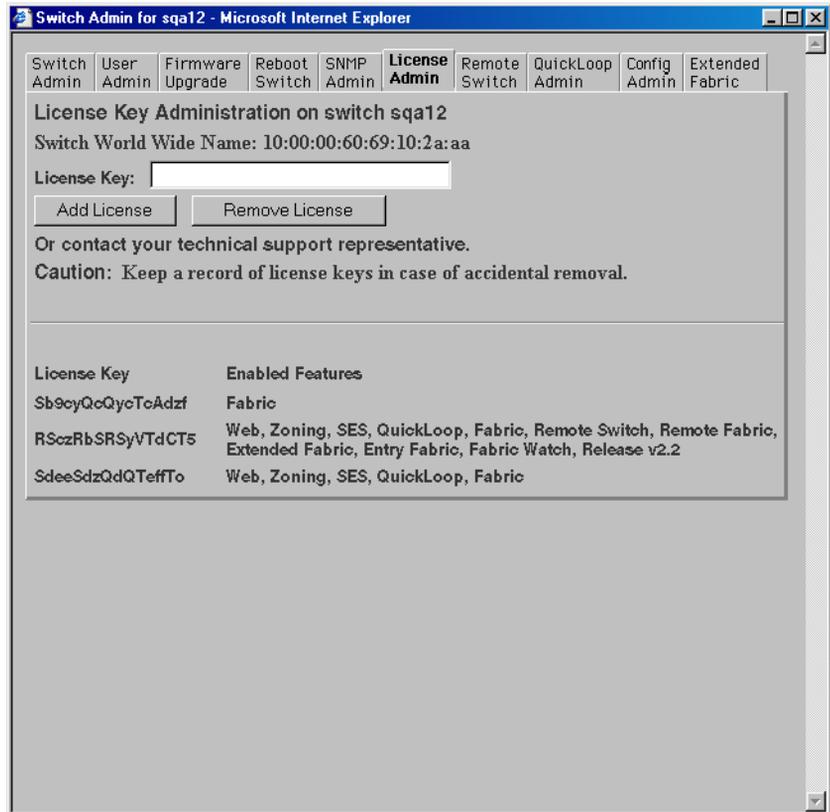


Figure 4-7 License Administration

Table 4-6 describes the fields on the License Administration tab:

Table 4-6 License Administration Fields

Field	Description
License Key	Enters license key to be added or removed.
Add License	Adds a specified license.
Remove License	Removes the specified license. <hr/> Removing a license could render a switch inoperable. Never remove a license key unless instructed to do so by EMC Technical Support. <hr/>
Text Box	A list of the licenses installed on the switch

Remote Switch

Use REMOTE SWITCH to configure a pair of switches to operate over an extended WAN interface so that they can communicate across an ATM network by using a CNT Fibre Channel to ATM interface. This feature requires an active REMOTE SWITCH sublicense in both switches.

To access Remote Switch, click the **Remote Switch** tab from any Administration function.

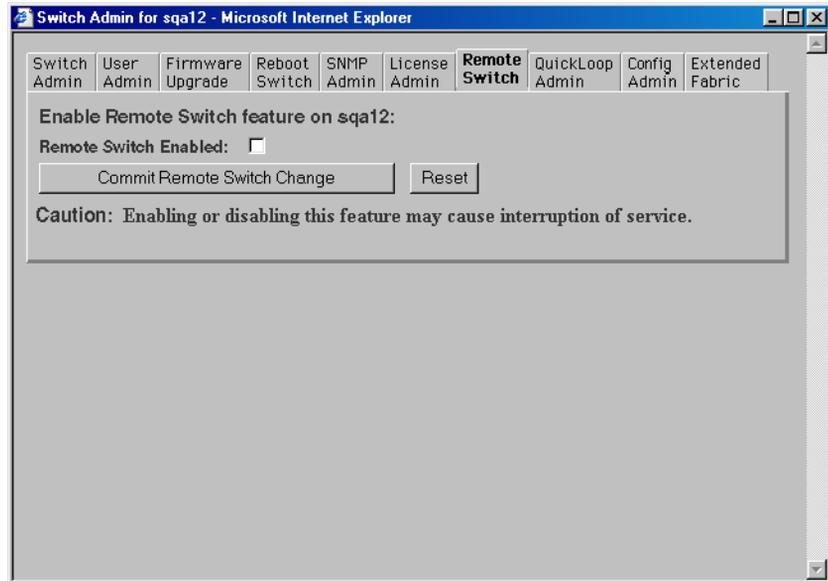


Figure 4-8 Remote Switch

Table 4-7 describes the fields on the Remote Switch tab:

Table 4-7 Remote Tab Fields

Tab	Description
Remote Switch Enabled	Enables remote switch; check off to disable remote switch.
Commit Remote Switch Change	Applies changes made.
Reset	Resets all fields to values present when Remote Switch was launched.

QuickLoop Administration

Use QuickLoop Administration to set up a QuickLoop for a single switch or for a pair of switches. Select one or more switches, enable or disable a QuickLoop at the switch level, and turn QuickLoop on or off on an individual port.

For detailed information on QuickLoop, refer to the *Departmental Switch Models DS-16B and DS-8B QuickLoop Reference Manual*.

To access QuickLoop Administration, click the **QuickLoop Admin** tab from any Administration function.

Switch Admin for sqa12 - Microsoft Internet Explorer

Switch Admin | User Admin | Firmware Upgrade | Reboot Switch | SNMP Admin | License Admin | Remote Switch | **QuickLoop Admin** | Config Admin | Extended Fabric

Quickloop Config for sqa12

Enable Switch for QuickLoop Mode

Port No	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Quickloop Port Enabled:	<input checked="" type="checkbox"/>															
Quickloop Ports Bypassed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Current QuickLoop Partner :

WWN	Name	Domain Id
10:00:00:60:69:20:02:6c	sqa1900	2

Select a QuickLoop Partner for this Switch

AL_PA Bitmap (in hexadecimal) : 00000000 00000000 00000000 00000000

Local AL_PAs		Remote AL_PAs	
Port # (Port Id)	AL_PAs	Port # (Port Id)	AL_PAs
Not Available		Not Available	

Figure 4-9 QuickLoop Administration

Table 4-8 describes the fields on the QuickLoop Administration tab:

Table 4-8 QuickLoop Administration Fields

Field	Description
Enable Switch for QuickLoop Mode	Enables switch for QuickLoop; check off to disable switch for QuickLoop.
Port No	Displays the port number.
QuickLoop Port Enabled	Enables QuickLoop on port; check off to disable QuickLoop on port.
QuickLoop Ports Bypassed	If checked, indicates a port is currently bypassed.
Current QuickLoop Partner	Displays the current partner switch WWN, domain ID, and switch name of a dual-switch QuickLoop.
Select a QuickLoop Partner for this Switch	Selects a switch from the list of switch names currently in the fabric as the partner switch of a dual-switch QuickLoop.
Submit	Applies changes made.
Reset	Resets all fields to values present when QuickLoop Administration was launched.
AL_PA Bitmap (in hexadecimal)	Displays the AL_PA bitmap at the end of a QuickLoop initialization.
Local AL_PAs	Lists the AL_PAs of devices connected to the local switch.
Remote AL_PAs	Lists the AL_PAs of devices connected to the remote switch if dual-switch QuickLoop is configured.

Config Admin Tab

You can use the Config Admin tab to upload the switch configuration file for archiving, or to download a new configuration file from the host.

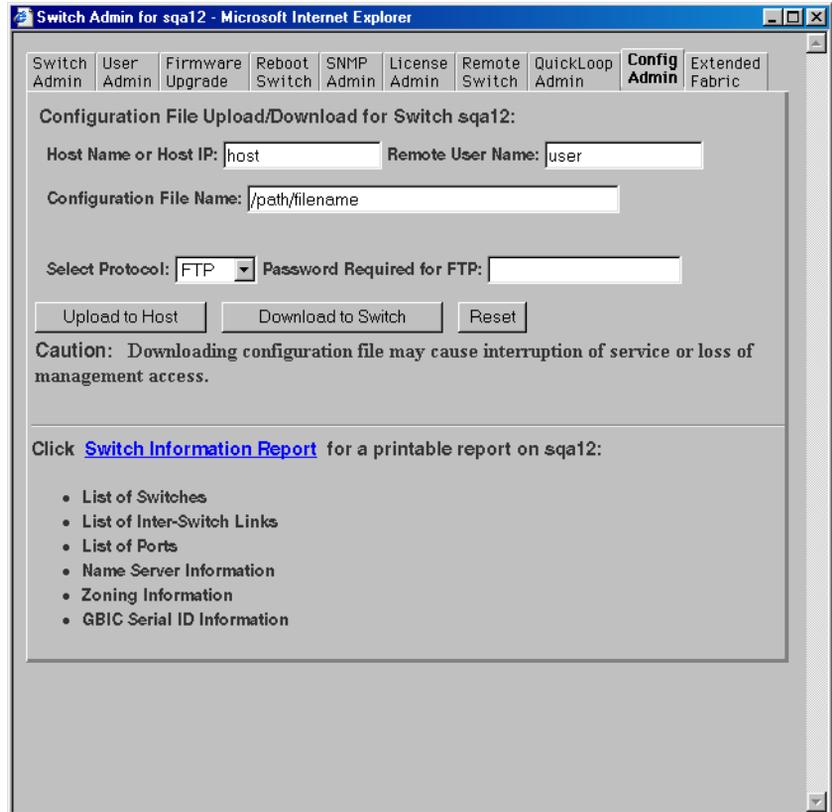


Figure 4-10 Config Admin Tab

Following is a description of the fields on the Config Admin tab:

Table 4-9 Config Admin Tab

Host Name or Host IP	Specify the host name or host IP address.
Remote User Name	Specify the remote user name.
Configuration File Name	Specify the name of the configuration file to be uploaded or downloaded.
Select Protocol	Specify FTP or RSHD protocols.
Password Required for FTP	Specify a password if one is required by the host.
Upload to Host	Click to retrieve configuration file from the switch.
Download to Switch	Click to send configuration file to the switch.
Reset	Click to reset all fields to values present when Configuration Administration was launched.
Switch information Report	Click to open a browser window displaying a status report for the switch. Information can be printed or saved to file.

Switch Information Report

The Switch Information Report can be generated by clicking on the corresponding link on the Config Admin tab in the Switch Admin window. It provides information about all the switches, interswitch links, and ports in the fabric.

Switch Information Report for sq12

List of Switches

Switch ID	Worldwide Name	Enet IP Addr	FC IP
2: fffc02	10:00:00:60:69:01:83:41	192.168.169.21	0.0.0.
3: fffc03	10:00:00:60:69:20:10:20	192.168.169.23	0.0.0.
4: fffc04	10:00:00:60:69:20:10:2b	192.168.169.22	0.0.0.
5: fffc05	10:00:00:60:69:10:2a:aa	192.168.169.12	0.0.0.
6: fffc06	10:00:00:60:69:20:18:cf	192.168.169.14	0.0.0.
10: fffc0a	10:00:00:60:69:30:08:03	192.168.169.10	0.0.0.
17: fffc11	10:00:00:60:69:02:39:75	192.168.169.18	0.0.0.
18: fffc12	10:00:00:60:69:10:19:bd	192.168.169.28	0.0.0.
19: fffc13	10:00:00:60:69:20:02:6c	192.168.169.19	192.16
25: fffc19	10:00:00:60:69:20:02:1e	192.168.169.20	192.16
96: fffc60	10:00:00:60:69:20:10:52	192.168.169.24	192.16
222: fffcde	10:00:00:60:69:30:05:10	192.168.169.11	0.0.0.

The Fabric has 12 switches

Ethernet IP Address: 192.168.169.12
 Ethernet Subnetmask: 255.255.255.0
 Fibre Channel IP Address: none
 Fibre Channel Subnetmask: none
 Gateway Address: 192.168.169.1

Kernel: 5.3.1
 Fabric OS: v2.3_alpha5
 Made on: Fri Sep 22 14:32:03 PDT 2000
 Flash: Fri Sep 22 14:47:17 PDT 2000
 BootProm: Thu Jun 17 15:20:39 PDT 1999

Figure 4-11 Switch Information Report

Extended Fabric Tab (Optional Software)

The Extended Fabric feature allows you to configure ports for a long distance link of up to 100 KM. The Extended Fabric license will only be installed on switches containing long wave GBICs. If the switch is purchased with long wave GBICs, the license will be installed at the factory.

You can use the Extended Fabric tab to specify which ports you want to be configured for distance and at what level.

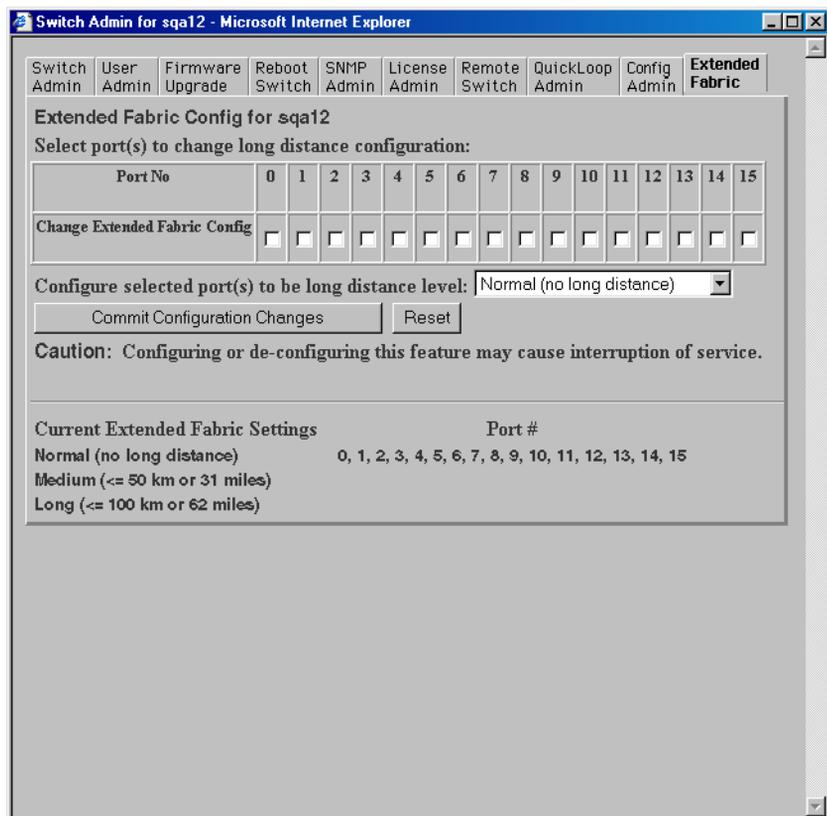


Figure 4-12 Extended Fabric Tab

Table 4-10 describes the fields on the Extended Fabric tab:

Table 4-10 Extend Fabric Fields

Field	Description
Port No	Displays the port number.
Change Extended Fabric Configuration	Designates the ports for which you want to change the long distance configuration.
Configure selected port(s) to be long distance level	Selects the long distance level to be supported for the selected ports. There are three levels: No long distance 50 KM 100 KM
Commit Configuration Changes	Applies configuration for Extended Fabric.
Reset	Resets all fields to values present when Extended Fabric was launched.
Current Extended Fabric Settings	Displays current settings by port number.

Telnet Interface

To access the Telnet Interface, click **telnet** on the Switch View.

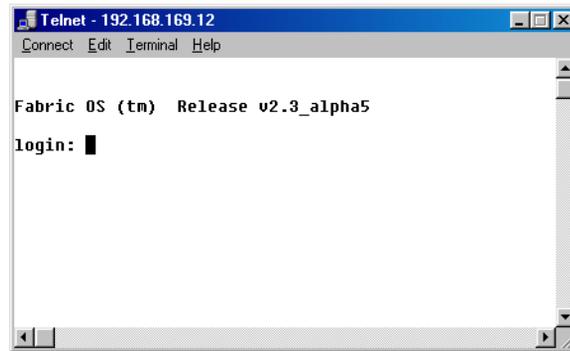


Figure 4-13 Initiating a Telnet Session

This brings up a Telnet session directly from your Web browser. Because only one telnet session can be active, the message box below appears if a session is already active. Click **Abort Session** to terminate the existing Telnet session or click **Cancel** to cancel the transaction.



Figure 4-14 Telnet Session in Use

You must have admin privilege to abort a telnet session.

This appendix reviews the EMC process for detecting and resolving software problems, and provides essential questions that you should answer before contacting the EMC Customer Support Center.

This appendix covers the following topics:

- ◆ Support Tool A-2
- ◆ Overview of Detecting and Resolving Problems A-3
- ◆ Troubleshooting the Problem A-4
- ◆ Before Calling the Customer Support Center A-5
- ◆ Documenting the Problem A-6
- ◆ Reporting a New Problem A-7
- ◆ Sending Problem Documentation A-8

Support Tool

Included in the switch software is a command that will display a variety of information that is helpful in diagnosing switch-related problems. This command is `supportShow`. You can enter `supportShow` into a Telnet session command window and the results should be saved and supplied to EMC Technical Support. For example:

```
supportShow > switchinfo.txt
```

Overview of Detecting and Resolving Problems

EMC software products are supported directly by the EMC Customer Support Center in the United States.

EMC uses the following process to resolve customer problems with its software products (Figure A-1).

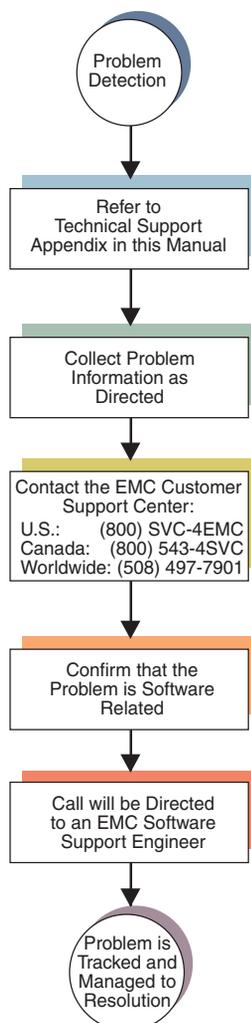


Figure A-1 Problem Detection and Resolution Process

Troubleshooting the Problem

Please perform the relevant diagnostic steps before you contact the EMC Customer Support Center:

1. Read the documentation carefully.
2. Reconstruct the events leading up to the problem and describe them in writing.
3. Run some test cases to reproduce the problem.

If you encounter a problem that requires technical programming or analysis, call the nearest EMC office or contact the EMC Customer Support Center at one of the following numbers:

United States: **(800) 782-4362 (SVC-4EMC)**

Canada: **(800) 543-4782 (543-4SVC)**

Worldwide: **(508) 497-7901**

Please do not request a specific support representative unless one has already been assigned to your particular system problem.

Before Calling the Customer Support Center

Have the following information available before calling the Customer Support Center or your support representative (if one has been assigned to you):

- Your company name
- Your name
- Your phone number
- For an existing problem, the problem tracking system ID, if one was previously assigned to the problem by a support representative

Documenting the Problem

If the EMC Customer Support Center requests information regarding the problem, please document it completely, making sure to include the following information:

- Your company name and address
- Your name
- Your telephone number
- The importance of the problem, so that it can be assigned a priority level

To expedite the processing of your support request, you can photocopy this list and include it with the package.

Reporting a New Problem

For a new problem, please provide the following information:

- Release level of the software that you are running
- Software installation parameters
- Host type on which you are running
- Operating system you are running and its release number
- Functions of the software that you are running
- Whether you can reproduce the problem
- Previous occurrences of the problem
- Whether the software has ever worked correctly
- Time period that the software did work properly
- Conditions under which the software worked properly
- Changes to your system between the time the software worked properly and the problem began
- Exact sequence of events that led to the system error
- Message numbers and complete text of any messages that the system produced
- Log file dated near the time the error occurred
- Results from tests that you have run
- Other related system output
- Other information that may help solve the problem

Sending Problem Documentation

Use one of the following methods to send documentation of the problem to the EMC Customer Support Center:

- ◆ E-mail
- ◆ FTP
- ◆ U.S. mail to the following address:

EMC Customer Support Center
45 South Street
Hopkinton, MA 01748-9103

If the problem was assigned a number or a specific support representative, please include that information in the address as well.

This glossary contains terms related to disk storage subsystems. Many of these terms are used in this manual.

ALPHANUMERIC

8b/10b encoding Encoding scheme that converts each 8-bit data byte into a 10-bit transmission character. Used to balance ones and zeros in high speed transports.

A

Address identifier Value used to identify source or destination of a frame.

AL_PA Arbitrated Loop Physical Address. Unique 8-bit value assigned during loop initialization to each port in an arbitrated loop.

Alias server Fabric software facility that supports multicast group management.

ANSI American National Standards Institute. Governing body for fibre channel standards in the U.S.A.

API Application Programming Interface. Defined protocol that allows applications to interface with a set of services.

Arbitrated loop A shared 100 MBps fibre channel transport structured as a loop. Allows communication between ports without using a switch. Requires successful arbitration by a port before a circuit is established. Supports up to 126 devices and one fabric attachment. This is similar to a shared bandwidth ring on a network.

ASIC Application-Specific Integrated Circuit.

ATM Asynchronous Transfer Mode. Transport for transmitting data over LANs or WANs that transmit fixed-length units of data. Provides any-to-any connectivity and allows nodes to transmit simultaneously.

B

Bandwidth The total transmission capacity of a link, cable, or system.

BB_Credit Buffer-to-buffer credit. The number of frames that can be transmitted to a directly connected recipient or within an arbitrated loop. Determined by number of available receive buffers. See also *Buffer-to-buffer flow control*, *EE_Credit*.

BER Bit Error Rate. Rate at which bits are expected to be received in error. Expressed as ratio of error bits to total bits transmitted. See also *Error*.

Bit synchronization The delivery of correctly clocked bits at the required BER. See also *BER*.

Broadcast Transmission of data from a single source to all devices in fabric, regardless of zoning. See also *Multicast*, *Unicast*.

Buffer-to-buffer flow control Management of frame transmission rate between directly connected ports or within an arbitrated loop. See also *BB_Credit*.

C

Cascade Two or more interconnected fibre channel switches. Some switches can cascade up to 32; others can cascade up to 239. For Department switches, a maximum of seven hops is recommended (no path longer than eight switches).

Circuit Established communication path between ports. Consists of two virtual circuits that transmit in opposite directions. See also *Link*.

Class 1 A connection-oriented service that provides a dedicated connection between two ports, with notification of delivery or non-delivery.

Class 2 A multiplex and connectionless frame switching service between two ports, with notification of delivery or nondelivery.

Class 3	A connectionless frame switching service between two ports, without notification of delivery or non-delivery. Can also be used to provide a multicast connection between originator and recipients, with notification of delivery or non-delivery.
Class F	A connectionless service for control traffic between switches, with notification of delivery or non-delivery between the E_Ports.
Class of service	A set of specific delivery characteristics and attributes for frame delivery.
Comma	Unique pattern (either 1100000 or 0011111) used in 8b/10b encoding to specify character alignment within a data stream. See also <i>K28.5</i> .
Community (SNMP)	Relationship between a group of SNMP managers and an SNMP agent, in which authentication, access control, and proxy characteristics are defined.
CRC	Cyclic Redundancy Check. A check for transmission errors; included in every data frame.
Credit	As applies to fibre channel, the number of receive buffers available for transmission of frames between ports. See also <i>BB_Credit</i> and <i>EE_Credit</i> .
Cut-through	Switching technique that allows selection of a transmission route for a frame as soon as destination address is received. See also <i>Route</i> .
D	
Data word	Type of transmission word that occurs within frames. The frame header, data field, and CRC all consist of data words. See also <i>Frame</i> , <i>Ordered set</i> , and <i>Transmission Word</i> .
Defined configuration	The complete set of all zone objects defined in the fabric; can include multiple zone configurations. See also <i>Enabled configuration</i> , <i>Zone configuration</i> .
Disparity	The relationship of ones and zeros in an encoded character. Neutral disparity indicates an equal number of each, positive disparity a majority of ones, and negative disparity a majority of zeros.

DLS Dynamic Load Sharing. Dynamic distribution of traffic over available paths. Allows for redistribution when an Fx_Port or E_Port comes up or down.

Domain ID As applies to some switches, a unique number between 1 and 239 that identifies the switch to the fabric.

E_D_TOV Error Detect Time-out Value. Time allowed for round-trip transmission before recovery is initiated. Can also be defined as the minimum time an L_Port waits for sequence completion before initiating recovery. See also *R_A_TOV*.

E

E_Port Expansion Port. A switch port that has the ability to connect to a similar port on another switch, allowing creation of an interswitch link. See also *ISL*.

EE_Credit End-to-end credit. The number of receive buffers allocated by recipient port to originating port. Used by Class 1 and 2 services to manage exchange of frames across intervening ports in fabric. See also *End-to-end flow control*, *BB_Credit*.

Enabled configuration The currently enabled zone configuration. Only one configuration can be enabled at a time. See also *Defined configuration*, *Zone configuration*.

End-to-end flow control Governs flow of Class 1 and 2 frames between N_Ports. See also *Buffer-to-buffer flow control*, *EE_Credit*.

Error As applies to fibre channel, a missing or corrupted frame, time-out, loss of synchronization, or loss of signal. See also *Loop failure*.

Exchange As applies to fibre channel, a communication session between N_Ports involving the transmission of one or more related sequences, in one or both directions. See also *Sequence*.

Extended Fabrics A product that allows interconnection of fibre channel fabric over distances of up to 100 kilometers.

F

F_Port	Fabric Port. A port that can transmit using fabric protocol and can interface over links. Can be used to connect N_Ports to a switch. See also <i>FL_Port</i> , <i>Fx_Port</i> .
Fabric	A fibre channel network of two or more switches. Also called a "switched fabric." See also <i>SAN</i> , <i>Cascade</i> .
Fabric name	Unique 64-bit identifier assigned to each separate fabric. Communicated during login and port discovery.
Fabric OS™	Proprietary operating system on DS-16B and DS-8B switches.
Fabric Watch™	DS-16B and DS-8B product that allows monitoring and configuration of fabric and switch elements.
FC-AL-3	The Fibre Channel Arbitrated Loop standard. Defined on top of FC-PH standards.
FC-FLA	The Fibre Channel Fabric Loop Attach standard.
FCP	Fibre Channel Protocol. Mapping of protocols onto fibre channel standard protocols. For example, SCSI FCP maps SCSI-3 onto fibre channel.
FC-PH-1, 2, 3	The Fibre Channel Physical and Signaling Interface standards.
FC-PI	The Fibre Channel Physical Interface standard.
FC-PLDA	The Fibre Channel Private Loop Direct Attach standard. Applies to operation of peripheral devices on private loops.
FC-SW-2	The Fibre Channel Switch Fabric standard, second generation. Specifies tools and algorithms for interconnection and initialization of fibre channel switches.
Fibre channel transport	Protocol service that supports communication between fibre channel service providers. See also <i>FSP</i> .
Fill word	A word transmitted to keep a fibre active. Either an idle or ARB ordered set.

- FL_Port** Fabric Loop Port. A port that can transmit under both fabric protocol and loop protocol. Can be used to connect NL_Ports to a switch. See also *F_Port*, *Fx_Port*.
- FLOGI** Fabric Login. Process by which a node makes a logical connection to fabric. Used by ports to determine if fabric is present, and if so to exchange service parameters with the fabric. See also *PLOGI*.
- Frame** Fibre channel structure used to transmit data. Consists of start-of-frame delimiter, header, any optional headers, data payload, cyclic redundancy check (CRC), and end-of-frame delimiter. There are two types: data frames and link control frames. Similar to the networking concept "packet". See also *Sequence*, *Data word*.
- FRU** Field Replaceable Unit. A component that can be replaced on site.
- FS** Fibre Channel Service. A service that is defined by fibre channel standards and exists at a well-known address. For example, Name Server is a fibre channel service. See also *FSP*.
- FSP** Fibre Channel Service Protocol. The common protocol used for all fabric services, transparent to fabric type or topology. See also *FS*.
- FSPF** Fabric Shortest Path First. DS-16B and DS-8B routing protocol for fibre channel switches.
- Full-duplex** Mode of communication that allows a port to simultaneously transmit and receive frames. See also *Half-duplex*.
- Fx_Port** Fabric port that can operate either as F_Port or FL_Port. See also *F_Portt*, *FL_Port*.
- G**
- G_Port** Generic Port. Port that can operate either as E_Port or F_Port. Ports are defined as G_Ports when disconnected or have not assumed specific function within fabric.
- Gateway** IP address assignment that provides translation for incompatible networks. For example, ATM gateway can connect a fibre channel link to an ATM connection.
- GBIC** Gigabit Interface Converter. Removable serial transceiver module that allows gigabit physical-layer transport for fibre channel.

Gbps Gigabits (1,062,500,000 bits) per second.

GBps Gigabytes (1,062,500,000 bytes) per second.

H

Half-duplex Mode of communication that allows a port to either transmit or receive frames, but not both at once. The only exception is link control frames, which can be transmitted at any time. See also *Full-duplex*.

Hard address The AL_PA that an NL_Port attempts to acquire during loop initialization.

HBA Host Bus Adapter. Interface card between a server or workstation bus and the fibre channel network. Similar to a network interface card.

Hub Fibre channel wiring concentrator that collapses loop topology into physical star topology. Nodes are automatically added when active and removed when inactive.

I

Idle Continuous transmission of an ordered set when no data is being transmitted to maintain an active fibre channel link and bit, byte, and word synchronization. See also *Fill word*.

Initiator Server or workstation that initiates communications with storage devices over a fibre channel network. See also *Target*.

IOD In Order Delivery. A parameter that, when set, guarantees that frames are delivered in-order if possible, and dropped if not.

ISL Interswitch Link. Fibre channel link from the E_Port of one switch to E_Port of another. Used to connect equipment ports to fabric in loop configuration through FL_Port. See also E_Port, Cascade.

IU Information Unit. An individual set of information as defined by higher level process protocol definition, or upper-level protocol mapping.

J

JBOD Just a Bunch Of Disks. A number of disks connected in a single chassis to one or more controllers. See also *RAID*.

K

K28.5 Special 10-bit character used to indicate beginning of transmission words that perform fibre channel control and signaling functions. First seven bits are comma pattern. See also *Comma*.

L

L_Port Loop Port. Node or fabric port that can use loop protocol or fabric protocol. See also *Non-participating mode*, *Participating mode*.

Latency Time required to transmit a frame, from the time sent until time of arrival.

Link As applies to fibre channel, a physical connection between two ports, consisting of both transmit and receive fibres. See also *Circuit*.

Link services Protocol for link-related actions.

LIP Loop Initialization Primitive. The signal used to begin initialization in a loop. Indicates either loop failure or resetting of a node. See also *Loop initialization*.

Loop failure Loss of signal within a loop for any period of time, or loss of synchronization for longer than the time-out value. See also *E_D_TOV*.

Loop initialization Logical procedure used by L_Ports to discover environment. Can be used to assign AL_PA addresses, detect loop failure, or reset a node. See also *LIP*.

Loop_ID Hex value representing one of 127 possible AL_PA values in a loop.

Looplet Set of devices connected in a loop to a port that is part of another loop.

LPSM Loop Port State Machine. Logical entity that performs arbitrated loop protocols and defines behavior of L_Ports when they require access to arbitrated loop.

LWL Long wavelength fibre optic cable. Based on 1300 nm lasers supporting 1.0625 Gbps link speeds. Connectors are color-coded blue. See also *SWL*.

M

MIB Management Information Base. SNMP structure that provides configuration and device information to assist with device management.

Multicast Transmission of data from a single source to a number of specified N_Ports. See also *Broadcast, Unicast*.

Multimode Fibre-optic cabling specification allowing up to 500 meters between devices.

N

N_Port Node Port. Port that can attach to a fibre channel port. See also *NL_Port, Nx_Port*.

Name server Service of storing names, addresses, and attributes for up to 15 minutes, provided by a switch to other entities in fabric. Defined by fibre channel standards, and existing at a well-known address. Also called Simple Name Server, SNS, or directory service. See also *FS*.

NL_Port Node Loop Port. An N_Port that can use loop protocol Used to connect equipment ports to fabric in loop configuration through FL_Port. See also *N_Port, Nx_Port*.

Node Fibre channel entity with one or more N_Ports or NL_Ports.

Node name Unique identifier for a node, communicated during login and port discovery.

Non-participating mode Mode in which L_Port is inactive in loop and cannot arbitrate or send frames, but can retransmit received transmissions. Port enters mode if there are more than 127 devices in loop, and an AL_PA cannot be acquired. See also *Participating mode*.

Nx_Port Node port that can operate as either an N_Port or NL_Port.

O

Ordered set A type of transmission word that occurs outside of frames, and is used to manage frame transport and differentiate fibre channel control information from data. See also *Data word, Transmission word*. Use 8b/10b mapping and begin with the K28.5 character. They

include frame delimiters (which mark frame boundaries and describe frame contents), primitive signals (indicate events), and primitive sequences (indicate or initiate port states).

P

Participating mode	Mode in which an L_Port in a loop has valid AL_PA and can arbitrate, send frames, and retransmit received transmissions. See also <i>Non-participating mode</i> .
Phantom device	Device not physically in a loop but logically included by phantom address.
Phantom address	AL_PA value assigned to device not physically in loop. Also called phantom AL_PA.
PLOGI	Port Login. Port-to-port login process by which initiators establish sessions with targets. See also <i>FLOGI</i> .
Point-to-point	Two fibre channel devices connected by a direct link. See also <i>Topology</i> .
Port_Name	Unique FC identifier for port, communicated during login and port discovery.
POST	Power On Self Test. Series of self-tests run after a switch is rebooted or reset.
Private NL_Port	NL_Port that does not log into the fabric and communicates only with private NL_Ports in same loop.
Private device	Device that supports arbitrated loop protocol and understands 8-bit addresses, but cannot log into fabric.
Private loop	An arbitrated loop with no fibre channel attachment.
Protocol	A defined method and standards for communication.
Public NL_Port	NL_Port that logs into the fabric, can function within public or private loops, and can communicate with public or private NL_Ports.
Public device	Device that supports arbitrated loop protocol, understands 8-bit addresses, and can log into fabric.
Public loop	An arbitrated loop attached to a switch.

Q

QuickLoop™ Can indicate either the DS-16B and DS-8B product that allows private devices within loops to communicate over the fabric with other devices, or the set of actual devices or looplets connected in a loop by the QuickLoop technology. All devices in a QuickLoop share a single AL PA space and behave as if they are in one loop.

R

R_A_TOV Resource Allocation Time-out Value. Maximum time a frame can be delayed in the fabric and still be delivered. See also *E_D_TOV*.

RAID Redundant Array of Independent Disks. Collection of disk drives that appear as a single volume to the server, and are fault-tolerant through mirroring or parity checking. See also *JBOD*.

Route As applies to fabric, a communication path between two switches. Routing is the assignment of Class 2 or 3 frames to the most appropriate switch ports for the intended destinations. See also *FSPF*.

RSCN Registered State Change Notification. Switch function that sends notification of fabric changes from the switch to specified nodes.

S

SAN Storage Area Network. Network of systems and storage devices that usually communicate using fibre channel protocols. See also *Fabric*.

Sequence A fibre channel structure containing one or more frames transmitted in a unidirectional manner between N_Ports. See also *Exchange*, *Frame*.

Single mode Fibre-optic cabling standard that provides for distances of up to 10 kilometers between devices.

SNMP Simple Network Management Protocol. Internet management protocol that does not rely on underlying communication protocols and can therefore be made available over other protocols, such as UDP/IP. Uses IP for network layer functions and UPD for transport layer function, or TCP/IP for both. See also *Community (SNMP)*.

SNS Simple Name Server. See *Name server*.

Switch	A combination of hardware and firmware that routes frames according to fibre channel protocol. Switches can have G_Ports, E_Ports, F_Ports, and FL_Ports.
Switch Domain_ID	Unique identifier for a switch, used in routing frames. Usually automatically assigned by the switch, but can be manually assigned by administrator.
Switch name	Arbitrary name assigned to switch by administrator. See also <i>Switch Domain_ID</i> .
SWL	Short wavelength fiber-optic cable. Based on 850 nm lasers supporting 1.0625 Gbps link speeds. Connectors are color-coded black. See also <i>LWL</i> .
T	
Target	Storage device that receives communications from a server or workstation over a fibre channel network. See also <i>Initiator</i> .
Topology	As applies to fibre channel, the structure of the fibre channel network and the resulting possible communication paths. There are three fibre channel topologies: point-to-point, fabric, and arbitrated loop.
Translative mode	Mode in which public devices can communicate with private devices across fabric. Translates 8-bit to 24-bit addresses.
Transmission Character	A 10-bit character encoded according to the rules of the 8b/10b algorithm. See also <i>8b/10b encoding</i> , <i>Transmission word</i> .
Transmission Word	Group of four transmission characters, totaling 40 bits. Two types: data words and ordered sets. See also <i>Data word</i> , <i>Ordered set</i> , <i>Transmission character</i> .
Trap (SNMP)	Message sent by SNMP agent to inform SNMP management station of critical error. See also <i>SNMP</i> .
Tunneling	Technique for enabling source and destination hosts to communicate when on same type of network but connected by a different type of network.

U

U_Port Universal Port. Switch port that can operate as G_Port, E_Port, F_Port, or FL_Port. A port is defined as a U_Port if not connected or if it has not assumed a specific function in the fabric.

ULP Upper Layer Protocol. Protocol that runs on top of fibre channel. Typical upper layer protocols: SCSI, IP, HIPPI, IPI.

Unicast Transmission of data from a single source to single destination. See also *Broadcast, Multicast*.

W Well-known address

As applies to fibre channel, a logical address stored on the switch and defined by fibre channel standards as being assigned to a specific function.

WWN World Wide Name. Identifier that is unique world-wide. Each entity in a fabric has a separate WWN.

Z

Zone Set of hosts and devices attached to same fabric and having access permission, including RSCNs and user data, to each other. Entities inside a zone are not visible to entities outside the same zone, even if the outside entities are in another zone. Equivalent to network term *virtual LAN*.

Zoning A way to partition fabric into logical groupings of devices.

Zone configuration A specified set of zones. Enabling a zone configuration enables all zones in that configuration. See also *Defined configuration, Enabled configuration*.

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