user's guide
version 2.3

Web Tools

www.hp.com

## Notice

Edition: E0801

## Warranty

If you have any questions about the warranty for this product, contact your dealer or local Hewlett-Packard sales representative.

## Trademarks

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Brocade Extended Fabrics, Brocade Fabric Manager, Brocade Fabric OS, Brocade Fabric Watch, Brocade QuickLoop, Brocade Remote Switch, Brocade Web Tools, and Brocade Zoning are hereafter referred to as Extended Fabrics, Fabric Manager, Fabric OS, Fabric Watch, QuickLoop, Remote Switch, Web Tools, and Zoning respectively.

## Safety notices

Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

## Format conventions

| | |
|---|---|
| *variable* | Indicates that you must supply a value. |
| output | Denotes text displayed on the screen. |
| [ ] | Indicates that the enclosed element is optional and may be left out. |
| { } | Indicates that you must specify one of the listed options. |
| \| | Separates alternatives. |
| . . . | Indicates a repetition of the preceding parameter. |

**Tip**   Denotes ideas for enhanced product usage.

**Note**   Denotes significant concepts or operating instructions.

**CAUTION**   Denotes a hazard that can cause hardware or software damage.

**WARNING**   Denotes a hazard that can cause personal injury or death.

# CONTENTS

# Revision History

July 2001           First release.

# PREFACE

Web Tools is supported for switches on Fabric OS a2.4.1 or later.

## About This Guide

This guide provides the following information:

| | |
|---|---|
| **Chapter 1**<br>Introducing Web Tools | Overview of Web Tools and a summary of the information available through Web Tools. |
| **Chapter 2**<br>Installing Web Tools | System requirements and instructions for installing and launching Web Tools. |
| **Chapter 3**<br>Using Web Tools | Information about and instructions for using each of the windows in Web Tools. |

# Related Publications

Related product information can be found in the following publications. Those publications with part numbers are provided as printed copies with your product. The HP Surestore FC Switch 6164 Documentation CD contains all publications listed in the table below and is also provided with your product.

| Title | Part Number |
|---|---|
| *HP Surestore FC Switch 6164 Documentation CD* | A7326-11011 |
| *HP Surestore FC Switch 6164 Installation and Reference Guide* | A7326-90902 |
| *HP Surestore FC Switch 6164 Quick Start Guide* | A7326-90901 |
| *Distributed Fabrics User's Guide, version 2.2* | Available only on CD |
| *Fabric OS Reference Manual, version 2.4* | Available only on CD |
| *Fabric Watch User's Guide, version 2.2* | Available only on CD |
| *MIB Reference Manual, version 2.3* | Available only on CD |
| *QuickLoop User's Guide, version 2.3* | Available only on CD |
| *Zoning User's Guide, version 2.2* | Available only on CD |

Information about fibre channel standards and the fibre channel industry in general can be found on the Fibre Channel Industry Association web site, located at:

http://www.fibrechannel.com

# Getting Help

For support information, visit the HP web site located at:

http://www.hp.com

# Getting Software Updates

Firmware and software updates are found on the HP web site located at:

http://www.hp.com

New switch firmware can be installed from the following host operating systems:

- UNIX

- Windows NT

- Windows 2000

- Windows 98

- Windows 95

# 1

# INTRODUCING WEB TOOLS

Web Tools runs on Fabric OS and provides a graphical interface that allows the administrator 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 Gigabit Interface Converter (GBIC) Serial IDs
    - Information about connected devices
    - Loop information
    - Port performance including frame counts (frames in, frames out) and error counts

# Views Available in Web Tools

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.

## Initial Display Upon Launching Web Tools (Fabric View)

Fabric View 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).

## Information 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. Click the Fabric Events icon on the control panel to access.

*Fabric Topology View*  Displays physical configuration, including active domains, paths, and routing information. Click the Fabric Topology icon on the control panel to access.

*Name Server Table View*  Displays the Name Server Table for the fabric. Use to view information about the devices attached to the fabric. Click the Name Server icon on the control panel to access.

*Zone Administration View*  Provides an interface to Zoning, including zone settings, zone aliases, QuickLoops, and zone configurations. Click the Zone Admin icon on the control panel to access.

*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. Click the Switch icon on a switch panel to access. 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. Click the Events icon on the switch panel to access, or access through Switch View (see "Switch Events View" on page 16). |
| *Telnet Interface* | Provides an interface for using Telnet commands for switch diagnostics, troubleshooting, and fabric management. Click the Telnet icon on the switch panel to access, or access through Switch View (see "Telnet Interface" on page 16). |
| *Administrative Interface* | Provides an interface for performing functions such as upgrading firmware versions or reconfiguring a switch. Click the Admin icon on the switch panel to access, or access through Switch View (see "Administrative Interface" on page 17). |

## Information Accessible From Switch View

| | |
|---|---|
| *Port Information View* | Displays statistics and status for the selected port, GBIC, or loop. Also provides options for managing loops. Click the icon for the relevant port in Switch View to access. |
| *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. Click Events in Switch View to access, or access through Fabric View (see "Initial Display Upon Launching Web Tools (Fabric View)" on page 14). |
| *Telnet Interface* | Provides an interface for using Telnet commands for switch diagnostics, troubleshooting, and detailed fabric management. Click Telnet in Switch View to access, or access through Fabric View (see "Initial Display Upon Launching Web Tools (Fabric View)" on page 14). |
| *Fabric Watch View* | Monitors fabric elements and displays error and performance counter status, issuing an alert when conditions are out of acceptable ranges. Click Watch in Switch View to access. |
| *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. Click Admin in Switch View to access, or access through Fabric View (see "Initial Display Upon Launching Web Tools (Fabric View)" on page 14). |
| *Performance View* | Graphically portrays real-time data throughput for each port and displays total switch bandwidth utilization. Click Perf in Switch View to access. |
| *Beacon Icon* | Click to turn the beacon, which is an indicator light on the front panel of the switch, on or off. The appearance of the 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). |

# 2

# INSTALLING WEB TOOLS

This chapter provides requirements and instructions for installing
Web Tools.

## Requirements

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

### Switch Requirements

Web Tools 2.3 can manage switches that meet the following requirements:

- 2400, 2800, 6164 switch
- Fabric OS a2.4.1or later installed

## Workstation Requirements

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

- One of the following operating systems:
  - 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

  **Note**   The browser must be configured to work with Web Tools. For information about how to do this, see "Installing a Web Browser" on page 21.

- The correct version of the Java Plug-in for the operating system:
  - Windows 95, 98, NT, or 2000: Java Plug-in version 1.2.2-007 or later

## Installation

Do the following to prepare to use Web Tools to manage your fabric:

- Install one of the supported web browsers on the workstation, if not already installed.
- Configure the web browser for use with Web Tools.
- Install 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

Correct operation of Web Tools with either Netscape Communicator or
Internet Explorer requires specific browser settings.

### Configuring Netscape Communicator

You must clear the web browser cache after installing Fabric OS a2.4.1.
Some browsers use local cache copies of jar files and/or image files to
improve performance (depending on the options selected in the browser),
which can corrupt display in Web Tools.

To remove cached files from Netscape Communicator:

1. Select Edit > Preferences.

2. Click Advanced in the left text box to expand it, then click Cache.

3. On the Cache panel, click Clear Memory Cache.

4. Click Clear Disk Cache.

5. Click OK.

6. Exit and relaunch the browser.

### Configuring Internet Explorer

You must clear the browser cache after installing Fabric OS a2.4.1. The
browser may use local cache copies of jar files and/or image files to
improve performance (depending on the options selected in the browser),
which can corrupt display.

To remove cached files from Internet Explorer:

1. Select View>Internet Options if using Internet Explorer 4.x, or from the Tools >Internet Options if using 5.x.

2. Select the General tab and click Delete Files... (under "Temporary Internet Files").

3. Click OK, then exit and relaunch the browser.

You must also specify the appropriate settings for browser refresh frequency.

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 View>Internet Options if using Internet Explorer 4.x, or from the Tools>Internet Options if using 5.x.

2. Select the General tab and click Settings (under "Temporary Internet Files").

3. Under "Check for newer versions of stored pages", select "Every visit to the page".

Finally, you must select the correct Browser Process Model.

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. Under "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.x.

# 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 Windows 2000 or NT

Windows 95, 98, 2000 and NT workstations require Java Plug-in version 1.2.2-007 or later.

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

1. Launch the Java Plug-in Control Panel from Start > Programs > Java Plug-in Control Panel and turn on the Java Console.

2. Launch the web browser, enter the name or IP address of a switch running Fabric OS a.2.4.1 or later, and press Enter.

3. The switch launches the Java Plug-in console, which displays the Java Plug-in version currently installed.

4. 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, point the browser to a switch running Fabric OS a2.4.1, follow the link to the Sun Microsystems web site, download the correct Java Plug-in, and double-click the downloaded file to install the plug-in.

   – If an outdated version is currently installed, uninstall it, relaunch the browser, enter the address of a switch running Fabric OS a2.4.1 or later, follow the link to the Sun Microsystems web site, and download the new Java Plug-in.

# Launching Web Tools

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

To launch Web Tools:

1.  Launch a web browser.
2.  Enter the switch name or IP address in the Location/Address field (for example: **http://***switchname*/) and press Enter.

    Web Tools launches, displaying the Fabric View.

# 3

## USING WEB TOOLS

This chapter describes the views and interfaces available through Web Tools.

**Note** 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 a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://**_switchname_/.

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**Note**   This switch is assumed to be the local domain. For information specific to a QuickLoop to be available, the QuickLoop switch must be the host domain.

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Web Tools launches, displaying Fabric View.



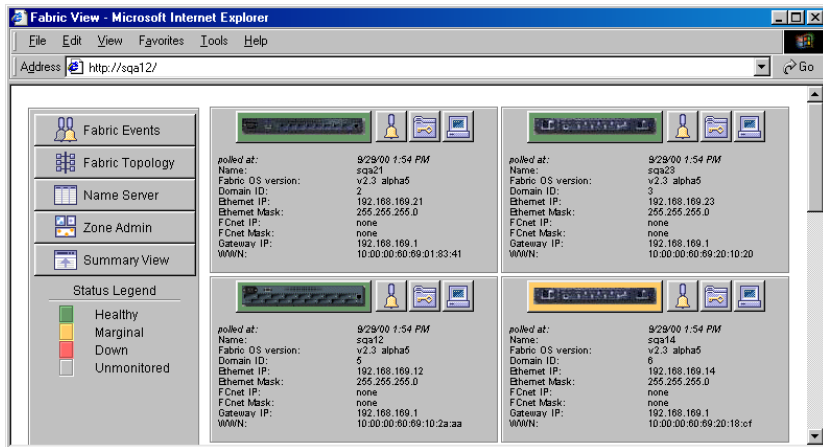*Figure 1.  Fabric View*

Following is a description of the items visible in Fabric View.

**The Control Panel (left side of Figure 1)**

*Fabric Events*

Click to open Fabric Events View (for information about this view, see "Fabric Events View" on page 29).
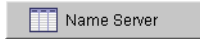
*Fabric Topology*

Click to open Fabric Topology View (for information about this view, see "Fabric Topology View" on page 31).

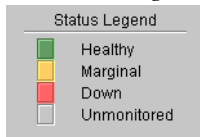| | |
|---|---|
| *Name Server Table* <br> Name Server | Click to open Name Server Table View (for information about this view, see "Name Server Table View" on page 34). |
| *Zone Admin* <br> Zone Admin | Click to open Zone Administration View (for information about this view, see "Zone Administration View" on page 36). |
| *Summary/Detail View* <br> Summary View | Toggle to view either the Summary or Detail version of Fabric View. The Summary version shows abbreviated switch panels (see Figure 2). The default view is Detail. |
| *Status Legend* <br> Status Legend <br> Healthy <br> Marginal <br> Down <br> Unmonitored | Defines meaning of colors visible in the background of the switch icons. Each color indicates a different operational state: |

- Green     Healthy
- Yellow    Marginal (mix of good and faulty readings)
- Red        Down (more than two faulty readings)
- Gray      Unknown or unmonitored

If no data is available from a switch, the most recent background color remains displayed.

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**Note** 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.

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**The Switch Panel (right side of Figure 1)**

| | |
|---|---|
| *Switch* | Click to open 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 "Switch View" on page 46). |
| *Events* | Click to open Switch Events View to display the switch events log (for information about this view, see "Switch Events View" on page 51). |
| *Admin* | Click to open Switch Administration View (for information about this view, see "Administrative Interface" on page 74). |

| | |
|---|---|
| *Telnet*  | Click to launch the Telnet interface for the switch (for information about this view, see "Telnet Interface" on page 93). |
| *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. |

Following is a picture of Fabric View with the Summary View selected:



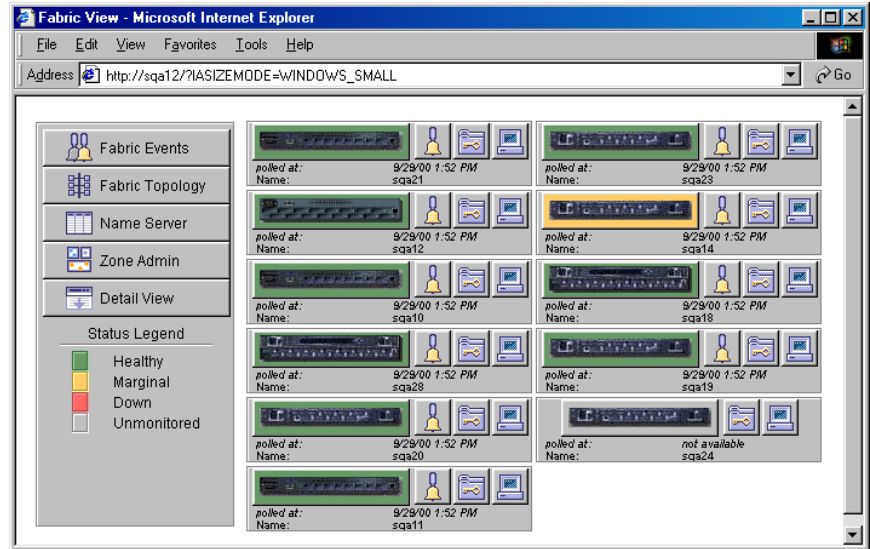*Figure 2. Summary Version of Fabric View*

# 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 a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:   **http://***switchname***/**.

   Web Tools launches, displaying Fabric View.

3. Click Fabric Events.

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

Warning: Applet Window

*Figure 3. Fabric Events View*

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

---

Following is a description of the columns in the Fabric Events view:

| | |
|---|---|
| Switch | Name of switch |
| Num... (number) | Event number for affected switch |
| Time | Time of event |
| Count | Number of consecutive occurrences of same event |
| Level | Severity level of event: |

Level — Severity level of event:
0   panic (switch reboots)
1   critical
2   error
3   warning
4   information
5   debug

Message   Description of event

*Web Tools User's Guide*

# 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 a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example: **http://***switchname*/.

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

   Web Tools launches, displaying Fabric View.

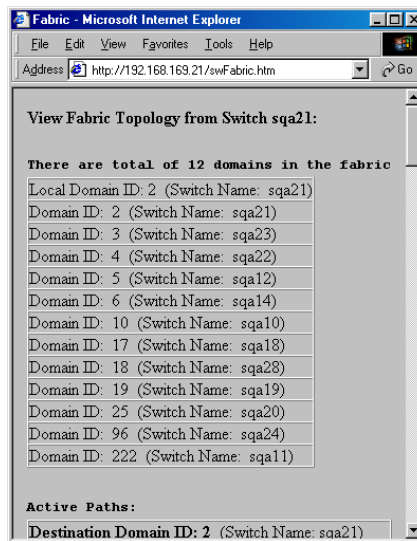3. Click **Fabric Topology**.

   The Fabric Topology View displays.



*Figure 4. Fabric Topology View*

---

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



*Figure 5.  Fabric Topology View, Scrolled Downwards*

Following is a description of the fields in the Fabric Topology View:

| | |
|---|---|
| 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. |

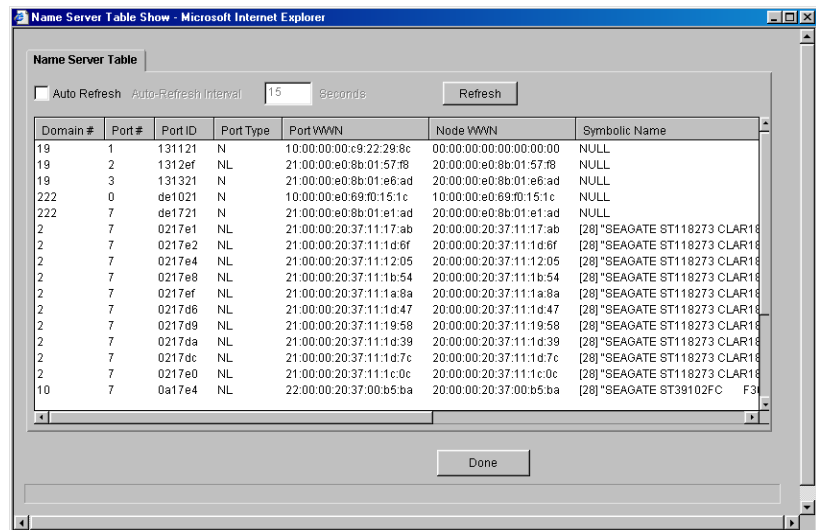| | |
|---|---|
| Active Paths: | This line is followed by information about each destination domain, including information about each of the paths between that domain and the local domain. |
| Destination Domain ID: | The ID of the destination domain that is described in the lines following the ID. 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 a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://***switchname/*.

   Web Tools launches, displaying Fabric View.

3. Click Name Server



*Figure 6.  Name Server Table View*

---

**Note**   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:

| | |
|---|---|
| Auto Refresh | Check to enable Auto Refresh or uncheck to disable. |
| Auto Refresh Interval | If Auto Refresh is checked, enter the number of seconds for the refresh interval. |
| Refresh | Click to refresh the window immediately. |
| Done | Click to close the window. |

The Name Server Table also includes the following columns:

| | |
|---|---|
| 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. |
| 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, the following steps are recommended:

1. Define zone aliases to establish groupings.

2. 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 a mode is selected, all zoning operations must correspond to that mode, and any zones, aliases, and configuration files which do not cannot be selected.

| | |
|---|---|
| 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 which have objects other than WWNs cannot be selected or operated on. |
| Device Level Zoning | Zoning by Quick Loop device. All alias, zoning, and configuration file operations must be on AL_PAs in a QuickLoop. Aliases, zones, and configuration files which have objects other than AL_PAs in a QuickLoop cannot be selected or operated on. |

| Mixed Level Zoning | Zoning by physical domain/port number, WWN, or AL_PA. 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 previous switches. |
|---|---|

For more information about using Zoning, see the *Zoning User's Guide*.

To access the Zone Administration View:

1.  Launch a web browser.

2.  Enter the switch name or IP address in the Location/Address field and press Enter. For example: **http://***switchname***/**. This switch is assumed to be the local domain.

    Web Tools launches, displaying Fabric View.

3.  Click Zone Admin.

    The Zone Administration View displays (see Figure 7).

---

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

---

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 38
- "Zone Tab" on page 40
- "QuickLoop Tab" on page 42
- "Config Tab" on page 44

## Alias Tab

You can use the Alias tab 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.
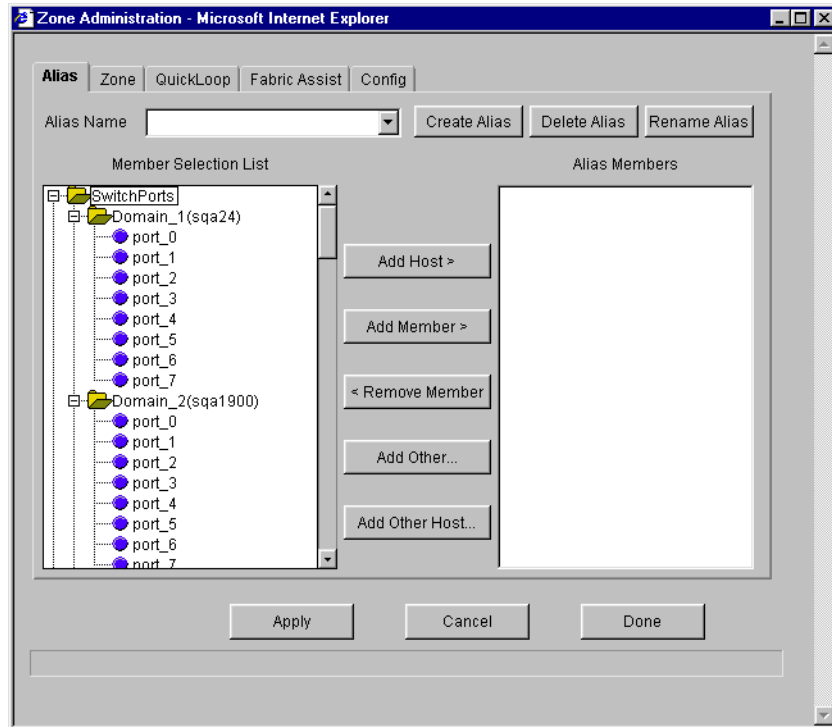


*Figure 7.   Alias Tab in the Zone Administration View*

Following is a description of the fields on the Alias tab:

| | |
|---|---|
| Alias Name | To modify an existing alias, select an alias name. |
| Create Alias | Click to create a new alias. A dialog box appears in which you can enter the name of the new alias. All names must be unique and contain no spaces. |

| | |
|---|---|
| Delete Alias | Click to delete the alias selected in the Alias Name field. Deleting an alias automatically removes it from all zones. |
| Rename Alias | Click to rename the alias selected in the Alias Name field. A dialog box appears in which you can edit the alias name. Renaming an alias automatically renames it in all zones. |
| Member Selection List | A list of potential alias members, including switches, ports, WWNs, and QuickLoop AL_PAs. |
| Add Member | Click to add 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 | Click to remove the selected member selected from the [Alias name] Members list. |
| Add Other | Click to add a WWN, switch port, or QuickLoop AL_PA 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 "null Members". |
| Apply | Click to apply 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 | Click to cancel all changes made since changes were last applied, and to exit the Zone Administration View. Changes cannot be cancelled once they are applied. |
|---|---|
| Done | Click to apply 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 to create and manage zones. A zone can have one or multiple members, and can include switches, ports, WWNs, aliases, and QuickLoop AL_PAs.
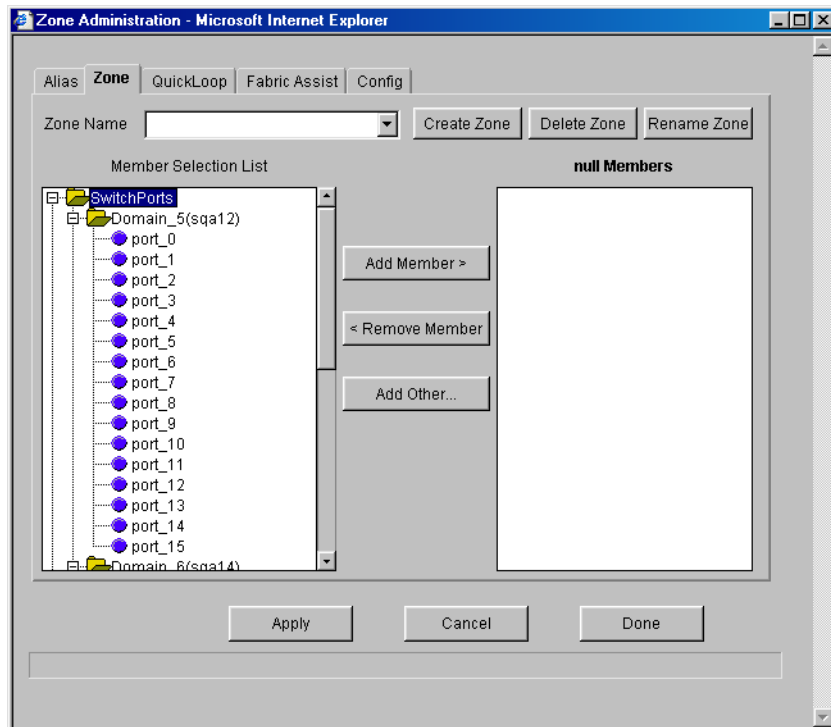


*Figure 8. Zone Tab in the Zone Administration View*

Following is a description of the fields on the Zone tab:

| | |
|---|---|
| Zone Name | To modify an existing zone, select a zone name. |
| Create Zone | Click to create a new zone. A dialog box appears in which you can enter the name of the new zone. All names must be unique and contain no spaces. |
| Delete Zone | Click to delete the zone selected in the Zone Name field. Deleting a zone automatically removes it from all zone configurations. |
| Rename Zone | Click to edit the name of the zone selected in the Zone Name field. A dialog box appears in which you can edit the name of the zone. |
| Member Selection List | A list of potential zone members, including switches, ports, WWNs, aliases, and QuickLoop AL_PAs. |
| Add Member | Click to add 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 sub-tree. To add an alias to the zone, select it from the Aliases sub-tree (the alias must already exist). |
| Remove Member | Click to remove the selected member from the [Zone name] Members list. |
| Add Other | Click to add 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 | Click to apply 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 | Click to cancel all changes since the changes were last applied and to exit Zone Administration. Changes cannot be cancelled once they are applied. |
|---|---|
| Done | Click to apply all changes made since the Zone Administration View was opened and to exit the Zone Administration View. |

## QuickLoop Tab

You can use the QuickLoop tab to create and manage QuickLoops if used in conjunction with Zoning. For information on managing the QuickLoop feature separately, see "Loop Tab" on page 61.
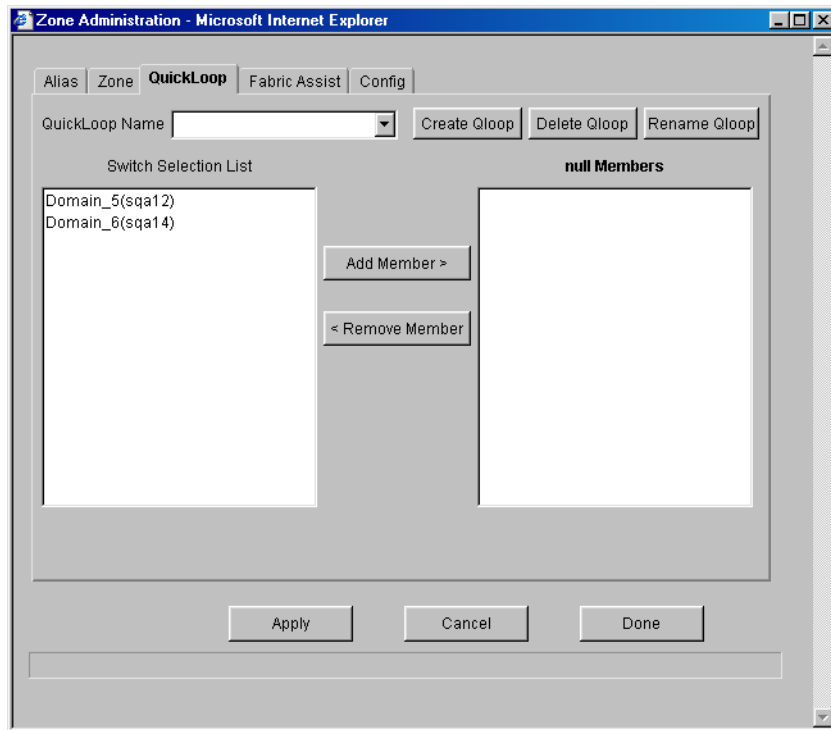


*Figure 9. QuickLoop Tab in the Zone Administration View*

Following is a description of the fields on the QuickLoop tab:

| | |
|---|---|
| QuickLoop Name | To modify an existing QuickLoop, select a QuickLoop name. |
| Create Qloop | Click to create a new QuickLoop. A dialog box appears in which you can enter the name of the new QuickLoop. All names must be unique and contain no spaces. |
| Delete Qloop | Click to delete 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 | Click to edit the name of the QuickLoop selected in the QuickLoop Name field. A dialog box appears in which you can edit the name of the QuickLoop. |
| Switch Selection List | A list of the switches available to add to the QuickLoop. |
| Add Member | Click to add the switch selected in the Switch Selection List to the QuickLoop Members list. |
| Remove Member | Click to remove the selected member from the [QuickLoop name] Members list. |
| [QuickLoop name] Members | A list of 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 "null Members". |
| Apply | Click to apply 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 | Click to cancel all changes since the changes were last applied and to exit Zone Administration. Changes cannot be cancelled once they are applied. |
| Done | Click to apply all changes made since the Zone Administration View was opened and to exit the Zone Administration View. |

## Config Tab

You can use the Config tab to create and manage zone configurations. Zone configurations allow you to enable or disable a group of zones at the same time.
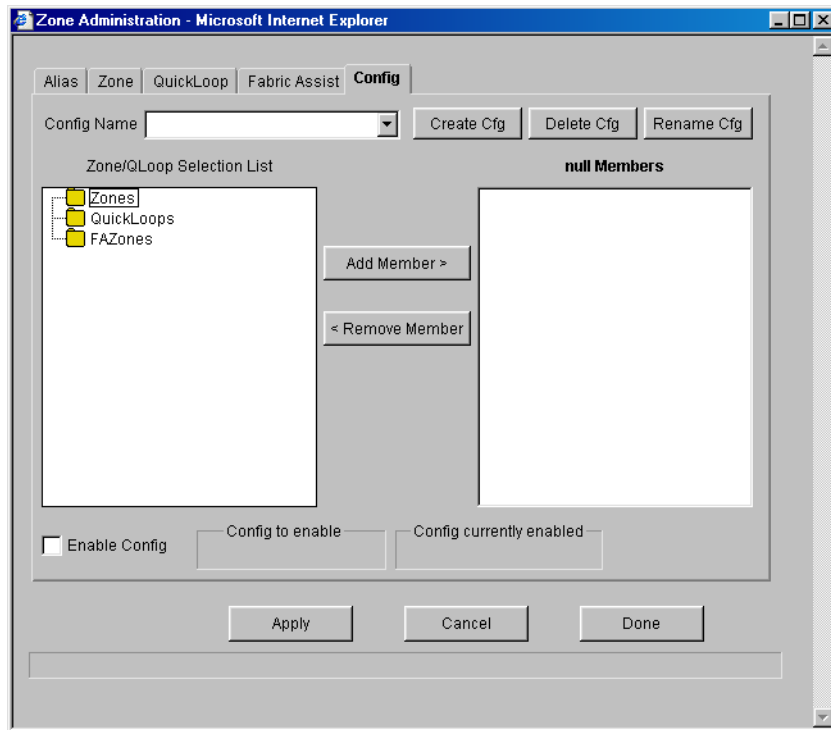


*Figure 10. Config Tab in the Zone Administration View*

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

Config Name
: To modify an existing configuration, select a configuration name.

Create Cfg
: Click to create a new configuration. A dialog box appears in which you can enter the name of the new configuration. All names must be unique and contain no spaces.

Delete Cfg
: Click to delete the configuration selected in the Config Name field.

Rename Cfg
: Click to edit the name of the configuration selected in the Config Name field.

Zone/QLoop Selection List
: A list of the zones and QuickLoops available to add to the configuration.

Add Member
: Click to add the switch selected in the Zone/QLoop Selection List to the Configuration Members list.

Remove Member
: Click to remove 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
: Check to enable 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
: Click to apply 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 | Click to cancel all changes since they were last applied and to exit the Zone Administration View. Changes cannot be cancelled once applied. |
| --- | --- |
| Done | Click to apply 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.

---

**Note**  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 a web browser.
2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://**_switchname_**/**.

   Web Tools launches, displaying Fabric View.
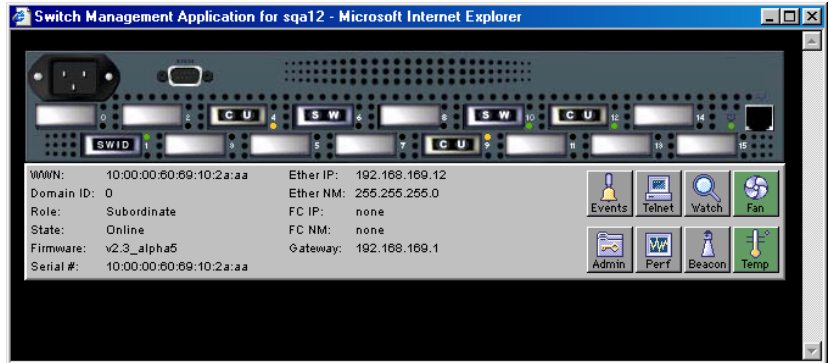
3. Click the Switch icon.



*Figure 11. Switch View*

Following is a description of the items and information available in Switch View:

Port icons



The letters in the Port icon indicate the Gigabit Interface Converter (GBIC) type, as follows:

- blank    No GBIC present
- SW       Short wave GBIC
- LW       Long wave GBIC
- SWID     Short wave serial ID GBIC
- LWID     Long wave serial ID GBIC

A yellow outline around a port icon indicates port failure. For detailed port information, click the Port icon to see the Port Information View.

Port numbers (on the right of each port)    The number of the port.

| | |
|---|---|
| LED Status Indicators (round light next to each port) | The color indicates the status of the port. |

- No light · · · · · · · · · · · · · No device attached
- Steady yellow · · · · · · · · · Receiving light, but not online; check cable connections
- Slowly flashing yellow · · · Disabled (diagnostics or portDisable command)

| | |
|---|---|
| LED Status Indicators (round light next to each port) | |

- 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 · · · Removable power assemblies are updated to show presence/absence and status of each:

- 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 · · · · · · · Click to access Switch Events View.

| Telnet | Click to launch a Telnet session. |
| --- | --- |

| Fabric Watch (optional software) | Click to access Fabric Watch. |
| --- | --- |

| Fan | The background color of the button indicates the overall status of the fans: |
| --- | --- |

- Green        Healthy
- Yellow      Marginal (mix of good and faulty readings)
- Red          Down (more than two faulty readings)
- Gray         Unknown or unmonitored

| Admin | Click to display the Administrative Interface where you can perform switch management functions. |
| --- | --- |

| Perf | Click to display the Performance View where you can monitor switch performance. |
| --- | --- |

| Beacon | Click to turn 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
Click to display temperature readings from all switch thermo sensors. The background color of the button indicates the overall temperature status:

- Green      Healthy
- Yellow     Marginal (mix of good and faulty readings)
- Red        Down (more than two faulty readings)
- Gray       Unknown or unmonitored

WWN
Unique numeric identifier for each switch; assigned by manufacturer.

Domain ID
Number that uniquely identifies the switch in a fabric.

Role
Indicates the current role of the switch.

- Principal     The principal switch as defined by FC_SW protocol.
- Subordinate   Enabled but not the principal switch.
- Disabled      Disabled.

State
Indicates the current state of the switch, which may be online, offline, testing, or 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.
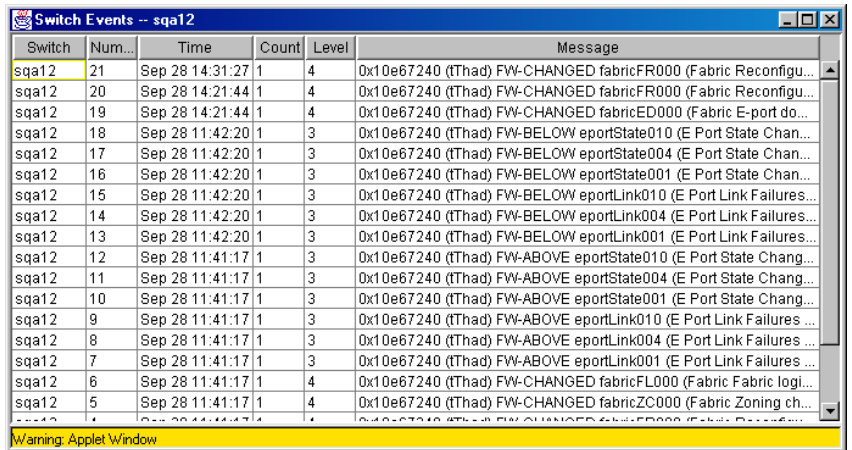
To access Switch Events View:

1. Launch a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example: **http://**_switchname_/.

   Web Tools launches, displaying Fabric View.

3. Click the Switch icon.

   The Switch View displays.

4. Click the Events icon.



| Switch | Num... | Time | Count | Level | Message |
|--------|--------|------|-------|-------|---------|
| sqa12 | 21 | Sep 28 14:31:27 | 1 | 4 | 0x10e67240 (tThad) FW-CHANGED fabricFR000 (Fabric Reconfigu... |
| sqa12 | 20 | Sep 28 14:21:44 | 1 | 4 | 0x10e67240 (tThad) FW-CHANGED fabricFR000 (Fabric Reconfigu... |
| sqa12 | 19 | Sep 28 14:21:44 | 1 | 4 | 0x10e67240 (tThad) FW-CHANGED fabricED000 (Fabric E-port do... |
| sqa12 | 18 | Sep 28 11:42:20 | 1 | 3 | 0x10e67240 (tThad) FW-BELOW eportState010 (E Port State Chan... |
| sqa12 | 17 | Sep 28 11:42:20 | 1 | 3 | 0x10e67240 (tThad) FW-BELOW eportState004 (E Port State Chan... |
| sqa12 | 16 | Sep 28 11:42:20 | 1 | 3 | 0x10e67240 (tThad) FW-BELOW eportState001 (E Port State Chan... |
| sqa12 | 15 | Sep 28 11:42:20 | 1 | 3 | 0x10e67240 (tThad) FW-BELOW eportLink010 (E Port Link Failures... |
| sqa12 | 14 | Sep 28 11:42:20 | 1 | 3 | 0x10e67240 (tThad) FW-BELOW eportLink004 (E Port Link Failures... |
| sqa12 | 13 | Sep 28 11:42:20 | 1 | 3 | 0x10e67240 (tThad) FW-BELOW eportLink001 (E Port Link Failures... |
| sqa12 | 12 | Sep 28 11:41:17 | 1 | 3 | 0x10e67240 (tThad) FW-ABOVE eportState010 (E Port State Chang... |
| sqa12 | 11 | Sep 28 11:41:17 | 1 | 3 | 0x10e67240 (tThad) FW-ABOVE eportState004 (E Port State Chang... |
| sqa12 | 10 | Sep 28 11:41:17 | 1 | 3 | 0x10e67240 (tThad) FW-ABOVE eportState001 (E Port State Chang... |
| sqa12 | 9 | Sep 28 11:41:17 | 1 | 3 | 0x10e67240 (tThad) FW-ABOVE eportLink010 (E Port Link Failures ... |
| sqa12 | 8 | Sep 28 11:41:17 | 1 | 3 | 0x10e67240 (tThad) FW-ABOVE eportLink004 (E Port Link Failures ... |
| sqa12 | 7 | Sep 28 11:41:17 | 1 | 3 | 0x10e67240 (tThad) FW-ABOVE eportLink001 (E Port Link Failures ... |
| sqa12 | 6 | Sep 28 11:41:17 | 1 | 4 | 0x10e67240 (tThad) FW-CHANGED fabricFL000 (Fabric Fabric logi... |
| sqa12 | 5 | Sep 28 11:41:17 | 1 | 4 | 0x10e67240 (tThad) FW-CHANGED fabricZC000 (Fabric Zoning ch... |

Warning: Applet Window

_Figure 12. Switch Events View_

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

Following is a description of the columns in Switch Events View:

| | |
|---|---|
| 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:<br>0  panic (switch reboots)<br>1  critical<br>2  error<br>3  warning<br>4  information<br>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 a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://***switchname*/.

   Web Tools launches, displaying Fabric View.

3. Click the Switch icon in Fabric View.
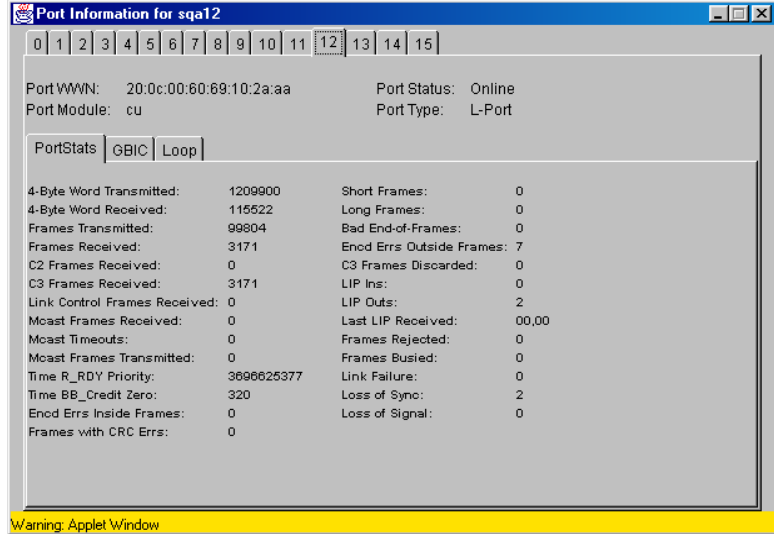
   The Switch View displays.

4. Click a Port icon.



*Figure 13.  Port Information View*

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

- "PortStats Tab" on page 56
- "GBIC Tab" on page 58
- "Loop Tab" on page 61

Following is a description of the fields that are visible in Port Information View regardless of which tab is selected:

Port WWN            Worldwide name (WWN) of this port.

Port Module         The GBIC type, as follows:

- --        No GBIC present
- SW       Short wave GBIC
- LW       Long wave GBIC
- SWID     Short wave serial ID GBIC
- LWID     Long wave 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 Status | | |
|---|---|---|
| | • TPort_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. |

**Note** 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.
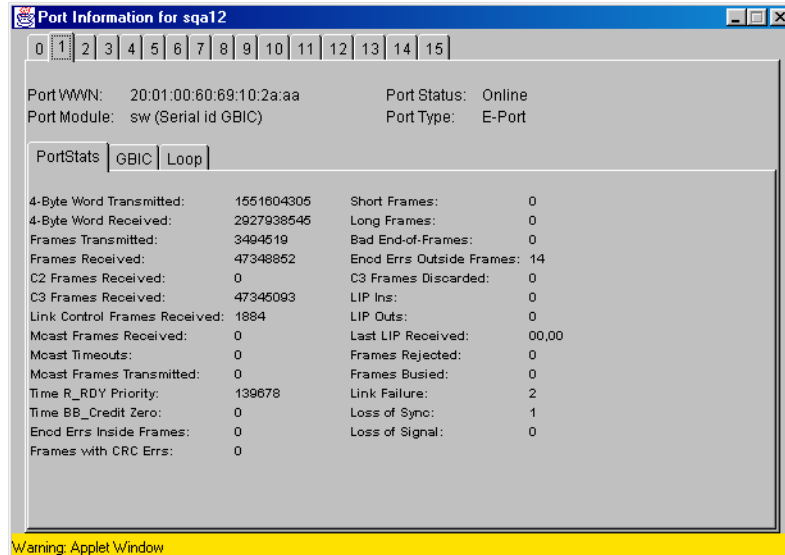


*Figure 14. PortStats Tab in the Port Information View*

Following is a description of the fields on the PortStats tab:

| | |
|---|---|
| 4-Byte Word Transmitted | Number of four-byte words transmitted. |
| 4-Byte Word Received | Number of four-byte words received. |
| Frames Transmitted | Number of frames transmitted. |
| Frames Received | Number of frames received. |
| C2 Frames Received | Number of class 2 frames received. |
| C3 Frames Received | Number of class 3 frames received. |
| Link Control Frames Received | Number of link control frames received. |
| Mcast Frames Received | Number of multicast frames received. |
| Mcast Time-outs | Number of multicast timeouts. |

*Web Tools User's Guide*

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

## GBIC Tab

The GBIC tab provides information about the GBIC installed in the selected port. The information displayed depends on the type of GBIC installed:

- Standard GBIC        Module type (short wave, long wave, 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."
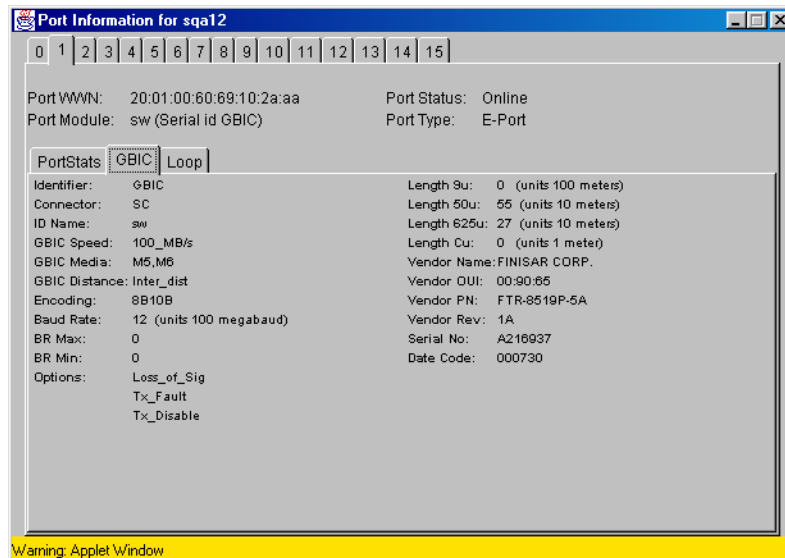


*Figure 15.  GBIC Tab in the Port Information View*

Following is a description of the fields on the GBIC tab:

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
- BNC/TNC
- Coaxial

ID Name — Indicates the GBIC module type:

- --    No GBIC present
- sw    Short wave GBIC
- lw    Long wave GBIC
- swid    Short wave serial ID GBIC
- lwid    Short wave serial ID GBIC
- cuid    Short wave serial ID GBIC

GBIC Speed — Indicates the GBIC speed, which can be 100, 200, or 400 MBps.

GBIC Media — Indicates the transmission media, which can be:

- SM    Single mode
- M5    Multi-mode, 50u
- M6    Multi-mode, 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). |
| 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 multi-mode fibre. |
| Length 625u | Length of link using 62.5um multi-mode fibre. |
| 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 (longwave only). |
| Current | Laser diode drive current in mAmps. |

## Loop Tab

The Loop tab 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)

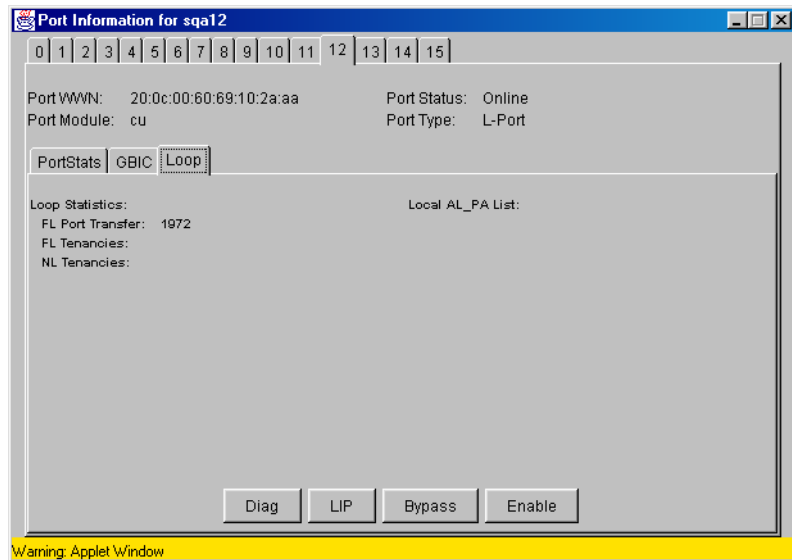If the port is not a loop-enabled port, the following information displays: "Not an L_Port. No loop info available."



*Figure 16.  Loop Tab in the Port Information View*

Following is a description of the fields on the Loop tab:

| | |
|---|---|
| FL Port Transfer | Displays number of times FL_Port used transfer state. |
| FL Tenancies | Displays the number of times FL_Port opens loop tenancy. |

| | |
|---|---|
| NL Tenancies | Displays the number of times NL_Port opens loop tenancy. |
| Number of QL/Zone Inits Caused | Displays number of times looplet has caused QuickLoop to be initialized. |
| Number of Successful QL/Zones Inits | Displays number of times looplet has successfully initialized. |
| Number of Failed QL/Zone Inits | Displays number of times looplet failed to successfully initialize. |
| Number of Times Being Bypassed | Displays number of times looplet was not included as part of QuickLoop. |
| Last Time bypassed | Displays time that looplet was last bypassed. |
| Local AL_PA List | Displays list of AL_PAs associated with devices connected to loop. |
| Number of QL Init Attempts | Displays number of times QuickLoop attempted initialization. |
| Number of Successful QL Inits | Displays number of time QuickLoop successfully initialized. |
| Number of Times in Single Switch Mode | Displays number of times switch reverted to single switch mode. |
| Number of Times in Dual Switch Mode | Displays number of times switch operated in dual switch mode. |
| Time of Last QL Init | Displays time of latest QuickLoop initialization. |
| Switch, Port Caused the Last Init | Displays number of switch, port that caused the latest initialization. |
| Diag | Click to open the Loop Diagnostics dialog box, which allows you to run loop diagnostics (requires password). For more information, see "Loop Diagnostics Dialog Box" on page 63. |

| | |
|---|---|
| LIP | Click to open the LIP dialog box, which allows you to initialize the loop (requires password). For more information, see "LIP Dialog Box" on page 64. |
| Bypass | Click to open the Bypass dialog box, which allows you to bypass a specified looplet (requires password). For more information, see "Bypass Dialog Box" on page 64. |
| Enable | Click to open the Enable dialog box, which allows you to enable an AL_PA on a specified looplet (requires password). For more information, see "Enable Dialog Box" on page 65. |

### Loop Diagnostics Dialog Box

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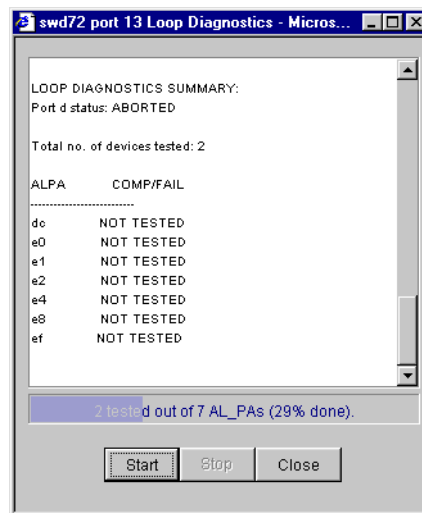


*Figure 17. Loop Diagnostics Dialog Box*

Following is a description of the fields in the Loop Diagnostics dialog box:

| | |
|---|---|
| Start | Click to start the Loop Diagnostics on the specified port. |
| Stop | Click to stop (abort) Loop Diagnostics on the specified port. |
| Close | Click to close 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 18.  LIP Dialog Box*

Following is a description of the fields in the LIP dialog box:

| | |
|---|---|
| Apply | Click to initialize a loop port. |
| Close | Click to close 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, click Bypass on the Loop tab of the Port Information View.
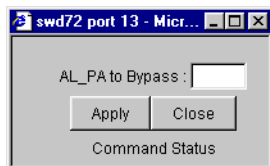


*Figure 19.  Bypass Dialog Box*

Following is a description of the fields in the Bypass dialog box:

| | |
|---|---|
| AL_PA to Bypass | Specify 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 | Click to bypass an AL_PA on the loop port (must be a valid AL_PA). |
| Close | Click to close 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, click Enable on the Loop tab of the Port Information View.
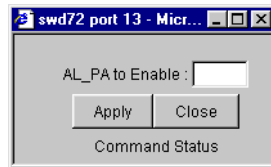


*Figure 20.  Enable Dialog Box*

Following is a description of the fields in the Enable dialog box:

| | |
|---|---|
| AL_PA to Enable | Specify AL_PA to be enabled. Entering **oxff** will enable all the AL_PAs in the loop. |
| Apply | Click to enable the AL_PA (must be valid AL_PA). |
| Close | Click to close Enable an AL_PA window. |

# Fabric Watch View (Optional Software)

You can use Fabric Watch View to monitor fabric elements for potential problem conditions. For detailed information about Fabric Watch, see the *Fabric Watch User's Guide*.

To access Fabric Watch View:

1. Launch a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://***switchname***/**.

   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 to view and customize the Fabric Watch notifications. You can either accept the default notifications or select

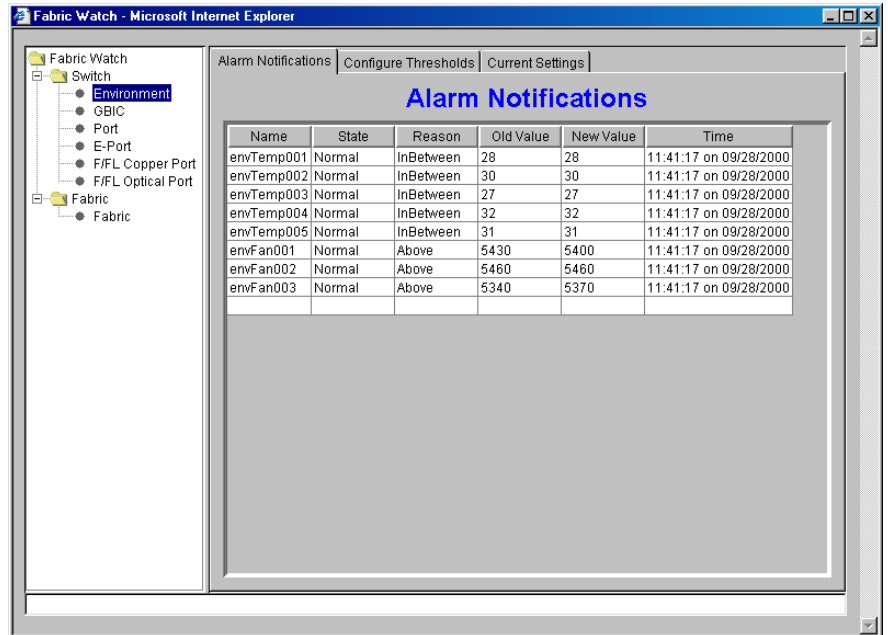the Custom option and specify the type of notification (Syslog, SNMP_Trap, or Port log lock) for each type of event.



*Figure 21. Alarm Notifications Tab in the 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.
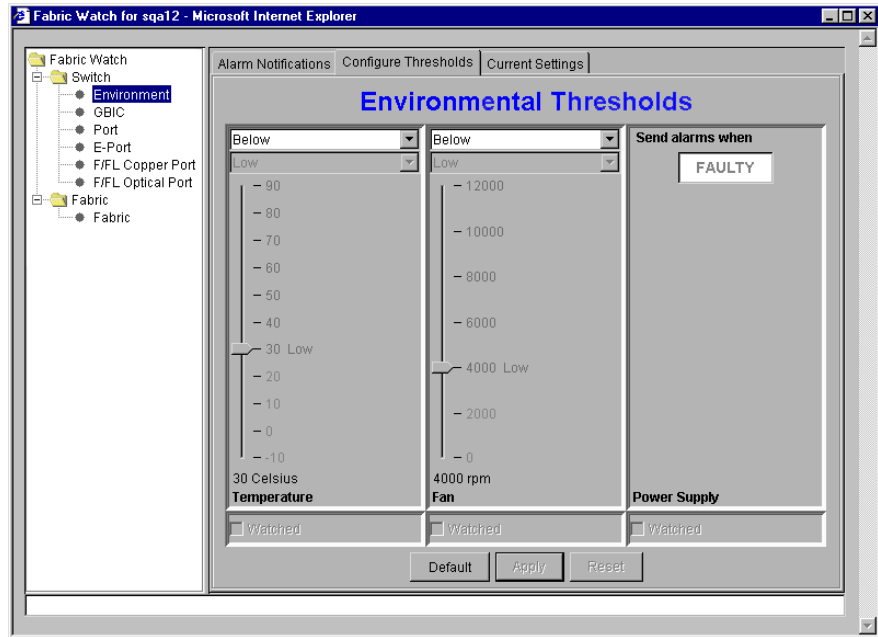


*Figure 22. Configure Threshold Tab with the Environment Class Selected in the Fabric Watch View*

*Web Tools User's Guide*

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 | Click to return settings to default values. |
| Apply | Click to apply the values specified in the current display. When Apply is clicked after a change, the following dialog displays: |



*Figure 23. Alarm Mechanism Dialog Box*

To continue, select the type of alarm you want and click **Apply**.

| | |
|---|---|
| Reset | Click to undo 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 22).

The columns for the Temperature, Fan, RX Power, and TX Power areas contain the following items:

| | |
|---|---|
| Threshold Type drop-down list | Select the threshold type (outranged, above, in-between, below, changed). |
| High/Low drop-down list | Select 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 | Specify the point at which you want to set the specified threshold. |
| Area drop-down list | Select a Fabric Watch area. |

| | |
|---|---|
| Watched checkbox | Check or uncheck to specify whether you want this area watched (not available for all areas). |

The columns for the Power Supply and Current areas contain the following item:

| | |
|---|---|
| "Send alarms when" box | Use this text box to specify 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, and 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):

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

The thresholds for the Port class are displayed in the following figure:
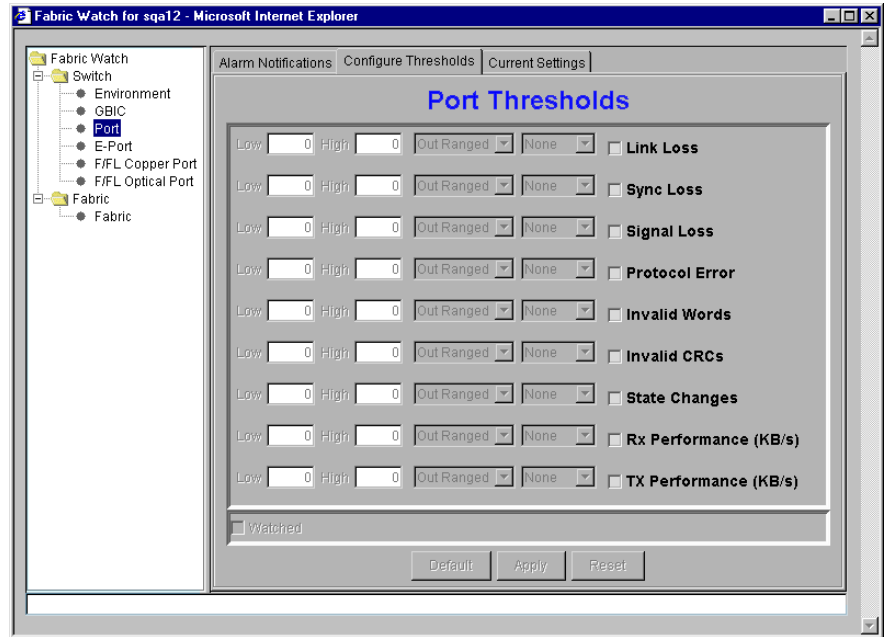


*Figure 24. Configure Threshold Tab with the Port Class Selected in Fabric Watch View*

## Current Settings Tab

The Current Settings tab allows you to view the current Fabric Watch threshold parameters for the area selected in the Fabric Watch tree.
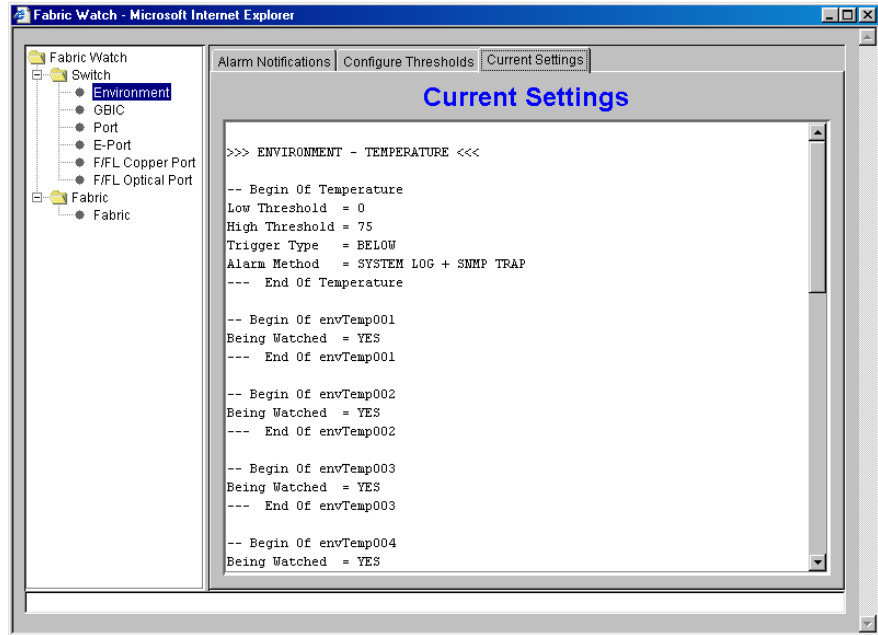


*Figure 25.  Current Settings Tab in the Fabric Watch View*

# 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 a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://***switchname/*.

   Web Tools launches, displaying Fabric View.

3. Click the Switch icon.

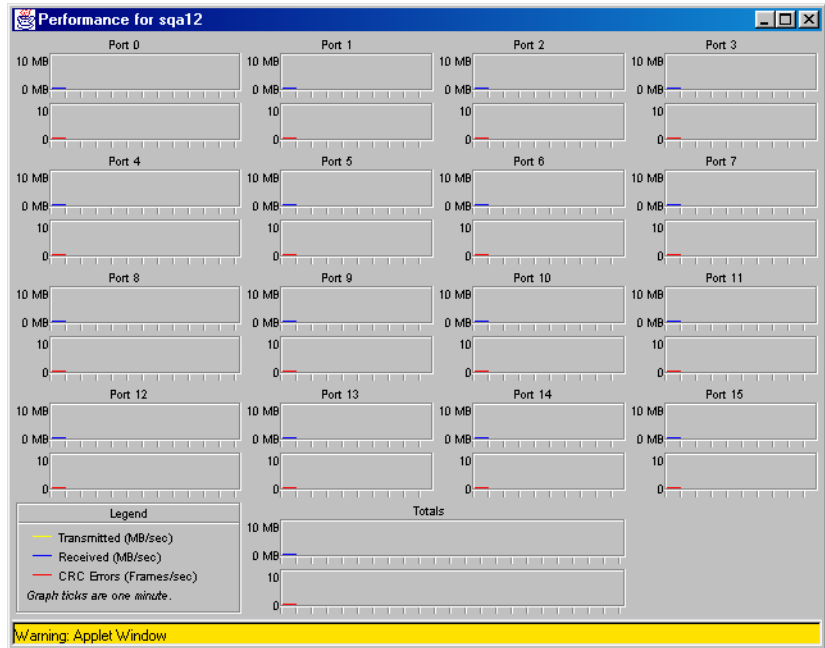   The Switch View displays.

4. Click the Performance icon.



*Figure 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. Each port graph contains up to 60 seconds of performance data, and the switch graph at the bottom of the view can contain up to four minutes of data.

# Administrative Interface

The Administrative Interface provides access to the administrative functions though the following tabs:

- "Switch Admin Tab" on page 76
- "User Admin Tab" on page 78
- "Firmware Upgrade Tab" on page 80
- "Reboot Switch Tab" on page 81
- "SNMP Admin Tab" on page 82
- "License Admin Tab" on page 84
- "Remote Switch Tab (Optional Software)" on page 85
- "QuickLoop Admin Tab (Optional Software)" on page 86
- "Config Admin Tab" on page 89
- "Extended Fabric Tab (Optional Software)" on page 91

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**Note**   The Administrative Interface requires administrative privileges. Once an administrative login is entered, administrative privileges remain available until the web browser is exited.
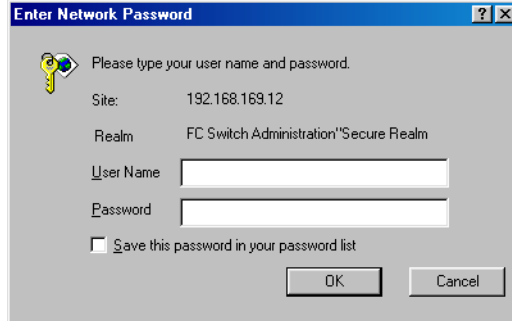
---

To access the Administrative Interface:

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

   Web Tools launches, displaying Fabric View.

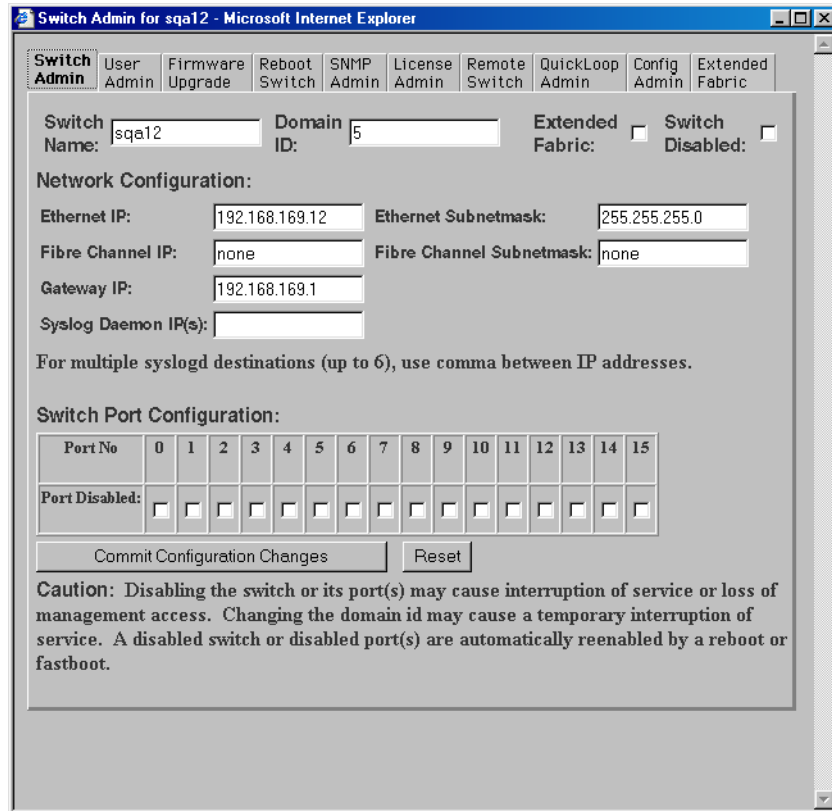3. Click the Admin icon on the switch panel.



*Figure 27. The Enter Network Password Dialog*

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.

## Switch Admin Tab

You can use the Switch Admin tab to change IP information, enable/disable a switch, change the domain, change the switch name, see which ports are enabled, and enable/disable individual ports.



*Figure 28.  Switch Admin Tab*

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

| | |
|---|---|
| Switch Name | Displays or sets the switch name. To change the name, enter new name in this field. |
| Domain ID | Displays or sets the switch domain ID. Domain IDs must be unique within a fabric. |
| | To change the domain ID, enter a 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. |
| Extended Fabric | Check to allow ports to be configured for long distance, or uncheck to turn the option off. |
| Switch Disabled | Check to disable the switch, or uncheck to enable the switch. |
| Ethernet IP | Displays or sets the IP address for Ethernet connection to switch. |
| Ethernet Subnetmask | Displays or sets Ethernet subnetmask. Default value is none. Contact the network administrator for the value to enter. If changed, restart the browser. |
| Fibre Channel IP | Displays or sets the fibre channel IP address. |
| Fibre Channel Subnetmask | Displays or sets the fibre channel subnetmask. If changed, restart the browser. |
| Gateway IP | Displays or sets the gateway IP address. Contact the network administrator for the IP address. If changed, restart the browser. |
| Syslog Daemon IP | Displays or sets the destination station IP address for sending events using syslog protocol to host. Contact the network administrator for the 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 | Port number. |

| Port Disabled | If the box is checked, the port is disabled. To enable the port, uncheck the box. |
| Commit Configuration Changes | Click to apply changes made. |
| Reset | Click to reset all fields to values present when Switch Administration was launched. |

## User Admin Tab

You can use the User Admin tab to rename accounts or change passwords.
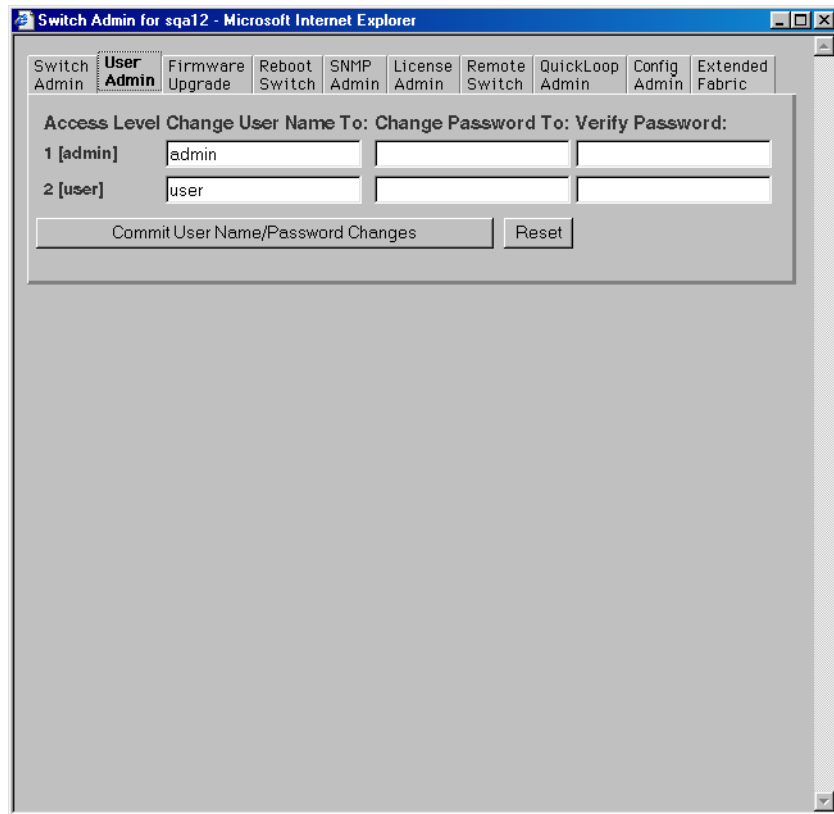


*Figure 29. User Admin Tab*

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

| | |
|---|---|
| Access Level | Access level required – Admin or User. |
| Change User Name To | Enter new user name. |
| Change Password To | Enter new password. |
| Verify Password | Re-enter password to verify. |
| Commit User Name/Password Changes | Click to apply changes made. |
| Reset | Click to reset all fields to values set at last submission. |

## Firmware Upgrade Tab

You can use the Firmware Upgrade tab to download firmware upgrades.
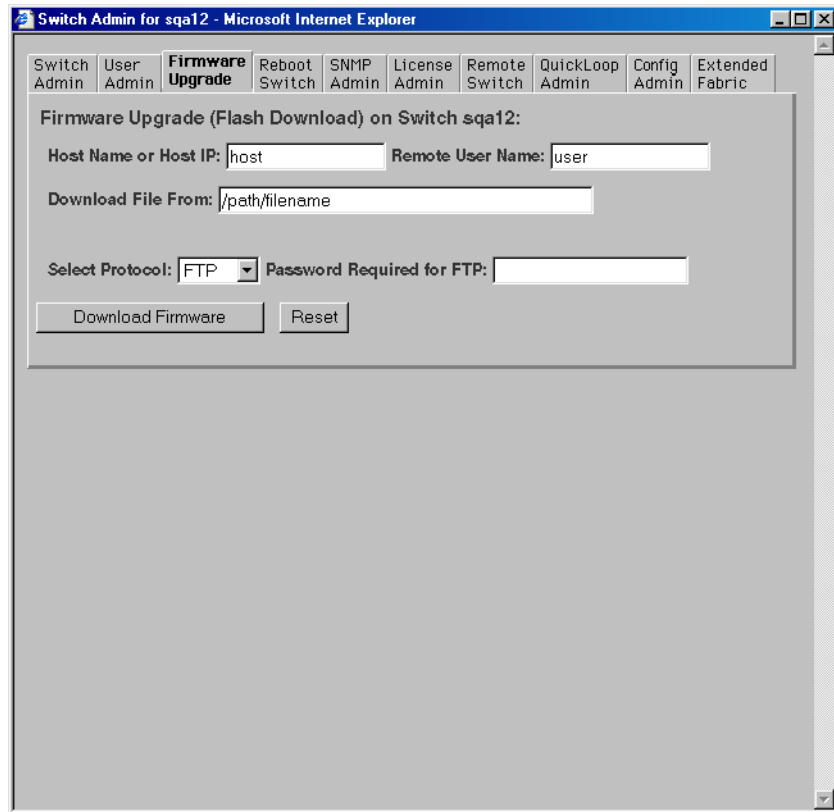


*Figure 30. Firmware Upgrade Tab*

Following is a description of the fields on the Firmware Upgrade tab:

| | |
|---|---|
| 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 | Enter path name for firmware download. |
| Select Protocol | Select the protocol for the download. |

| | |
|---|---|
| Password Required for FTP | Enter a password if FTP was selected as the protocol. |
| Download Firmware | Click to download firmware. |
| Reset | Click to reset all fields to values present when Firmware Upgrade was launched. |

## Reboot Switch Tab

You can use the Reboot Switch tab to reboot or fast boot the switch or to disable Power On Self Test (POST) for future reboots.
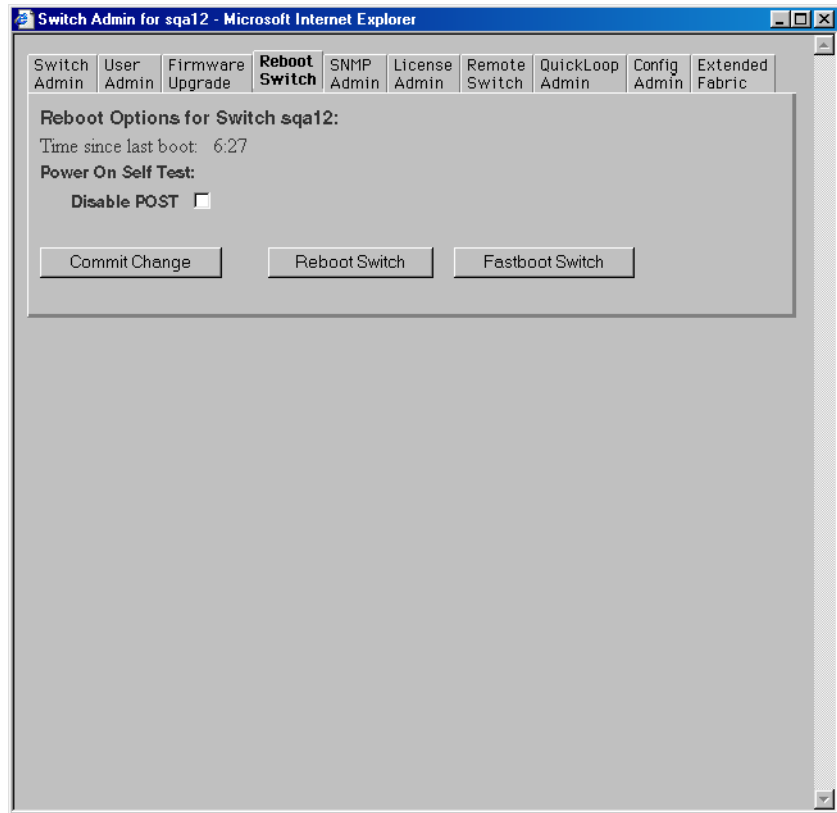


*Figure 31.  Reboot Switch Tab*

Following is a description of the fields on the Reboot Switch tab:

| | |
|---|---|
| Disable POST | Check to disable POST for future reboots, or uncheck to enable POST. |
| Commit Change | Click to save settings. |
| Reboot Switch | Click to reboot the switch. |
| Fastboot Switch | Click to perform a fast reboot. A fastboot bypasses POST. (It is the same as a reboot with POST disabled.) |

## SNMP Admin Tab

You can use the SNMP Admin tab to set SNMP options.



*Figure 32. SNMP Admin Tab*

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

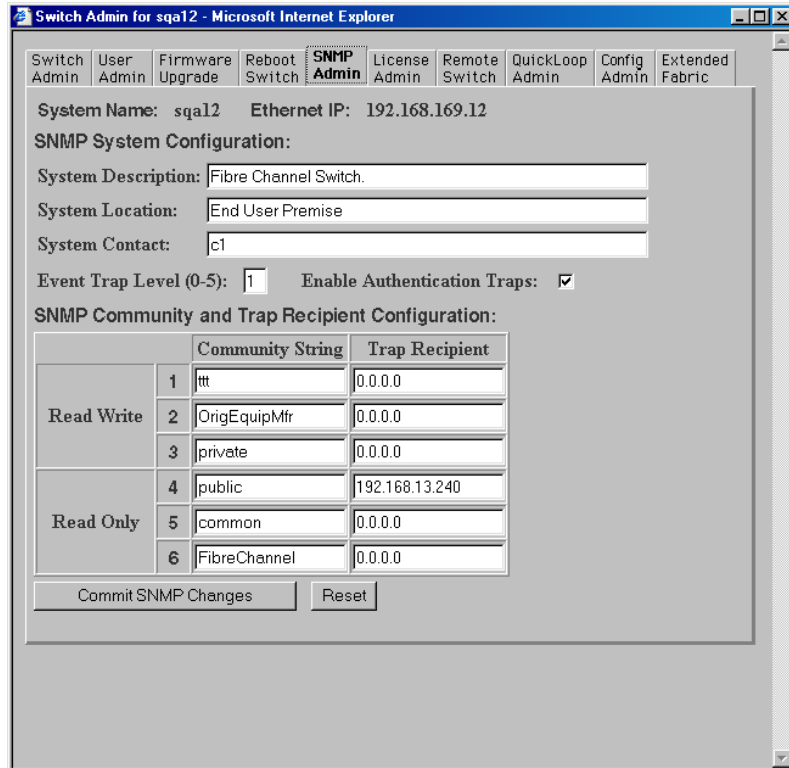| | |
|---|---|
| System Description | Displays or sets system description. Default is Fibre Channel Switch. |
| System Location | Displays or sets location of switch. Default is End User Premise. |
| System Contact | Displays or sets contact information for switch. Default is Field Support. |
| Event Trap Level | Sets severity level of switch events that prompt SNMP traps. Default is 0. |
| Enable Authentication Traps | Click on to enable authentication traps; click off to disable (recommended). |
| Read Write Community String | Displays or sets up to three strings that work with the SNMP set command. |
| Read Only Community String | Displays or sets up to three strings that work with the SNMP get or get-next command. |
| Read Write and Read Only Trap Recipients | Displays or sets recipients for traps (usually IP address of SNMP management station). |
| Commit SNMP Changes | Click to apply changes made. |
| Reset | Click to reset all fields to values present when SNMP Administration was launched. |

To disable the community string or trap recipient fields, leave them empty.

## License Admin Tab

You can use the License Admin tab to view a list of installed license keys and features or to add or remove licenses.
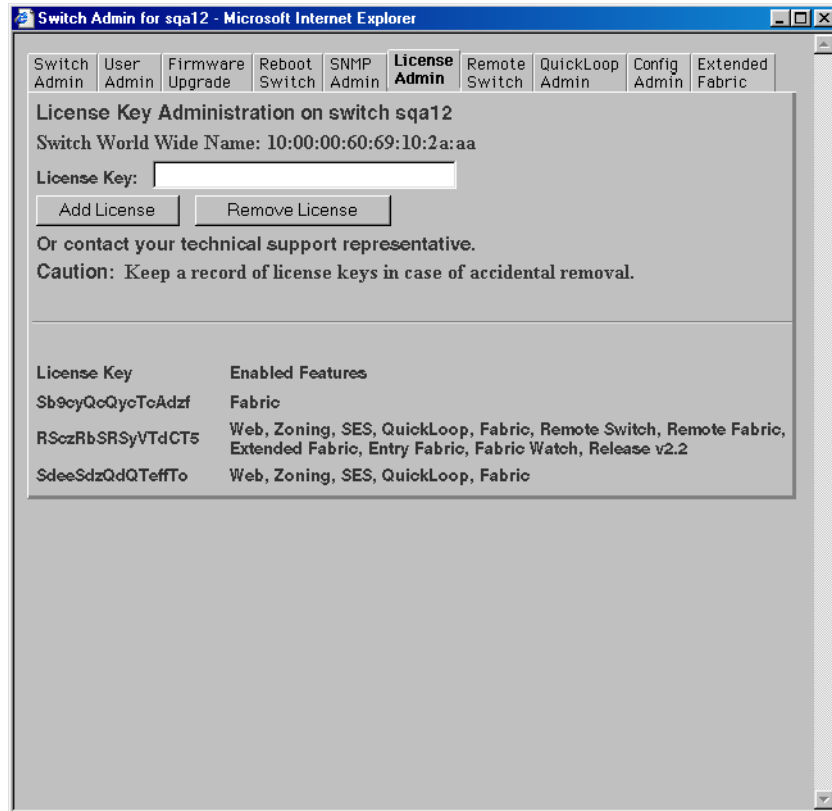


*Figure 33.  License Admin Tab*

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

| | |
|---|---|
| License Key | Enter license key to be added or removed. |
| Add License | Click to add specified license. |
| Remove License | Click to remove specified license. |
| Text box | A list of the licenses installed on the switch. |

## Remote Switch Tab (Optional Software)

You can use the Remote Switch feature 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 compatible Fibre Channel to ATM gateway. For detailed information on the Remote Switch feature, see the *Distributed Fabrics User's Guide*.

You can use the Remote Switch tab to enable or disable the Remote Switch feature on the selected switch.
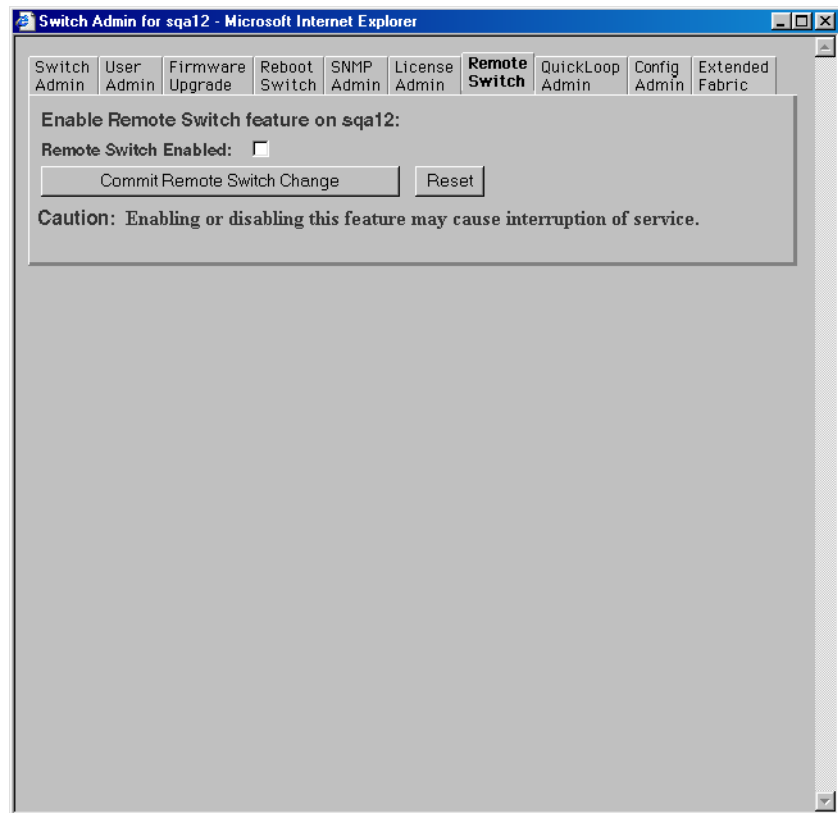


*Figure 34. Remote Switch Tab*

Following is a description of the fields on the Remote Switch tab:

| | |
|---|---|
| Remote Switch Enabled | Check to enable the Remote Switch feature, or uncheck to disable it. |
| Commit Remote Switch Change | Click to apply changes made. |
| Reset | Click to reset all fields to values present when Remote Switch was launched. |

## QuickLoop Admin Tab (Optional Software)

You can use the QuickLoop Admin tab to manage QuickLoop features. For information about managing the features available when QuickLoop and Zoning are used together, see "Zone Administration View" on page 36. For detailed information about the QuickLoop feature, see the *QuickLoop User's Guide*.

You can use the QuickLoop Admin tab to modify a QuickLoop or set up a partner switch.



*Figure 35. QuickLoop Admin Tab*

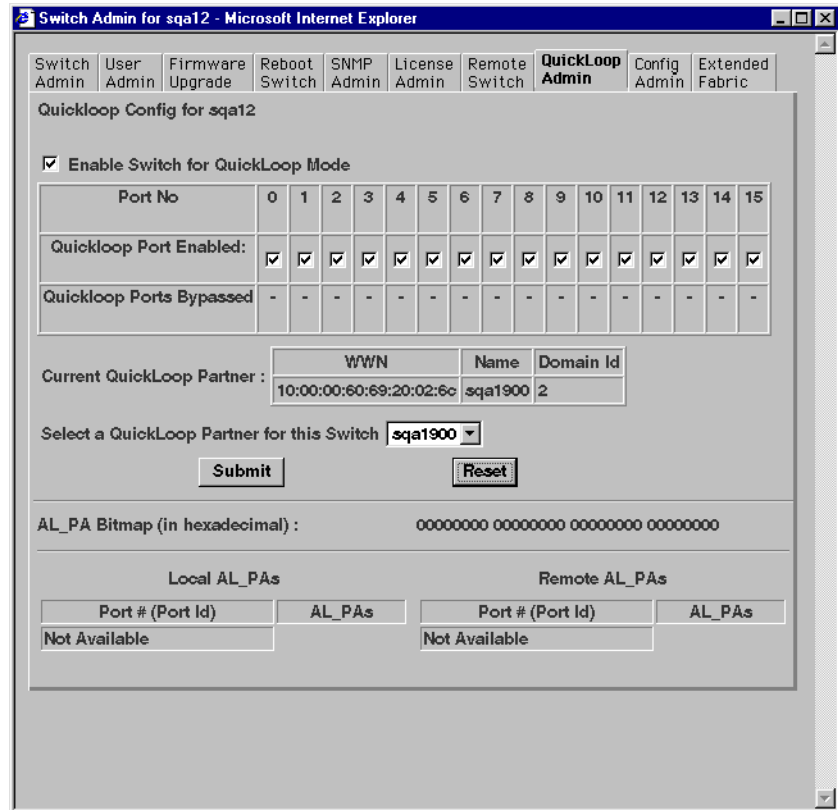Following is a description of the fields on the QuickLoop Admin tab:

| | |
|---|---|
| Enable Switch for QuickLoop Mode | Check to enable the switch for QuickLoop, or uncheck to disable the switch for QuickLoop. |
| Port No | Port number. |
| QuickLoop Port Enabled | Check to enable the port for QuickLoop, or uncheck to disable the port for QuickLoop. |

| | |
|---|---|
| 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 | Select a switch from the list of switch names currently in the fabric as the partner switch of a dual-switch QuickLoop. |
| Submit | Click to apply changes made. |
| Reset | Click to reset 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 in a dual-switch QuickLoop. This information only displays if a partner 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 36.  Config Admin Tab*

Following is a description of the fields on the 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 Conf Admin tab in the Switch Admin window. It provides information about all the switches, interswitch links, and ports in the fabric
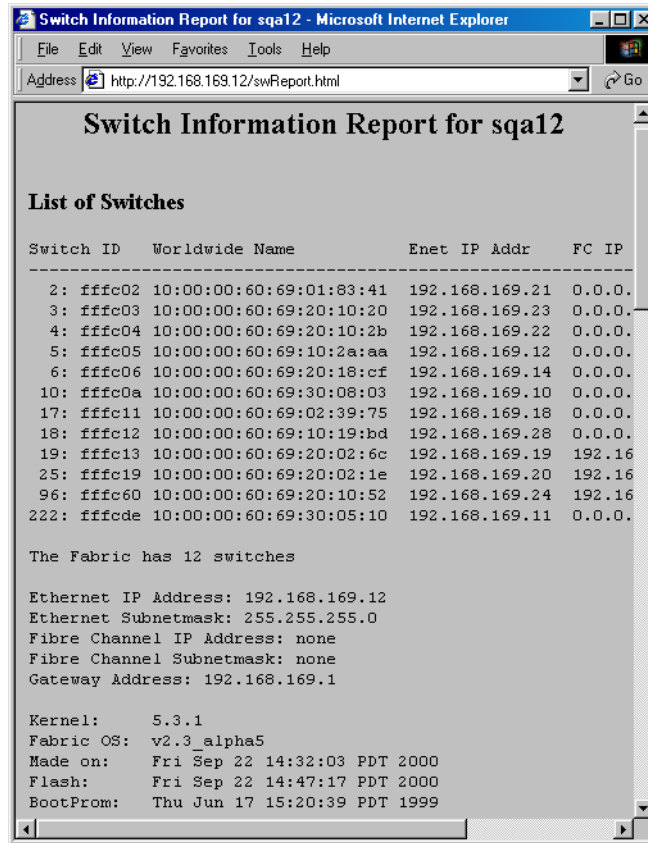
```
 Switch Information Report for sqa12 - Microsoft Internet Explorer    _ □ ×

  File   Edit   View   Favorites   Tools   Help

 Address  http://192.168.169.12/swReport.html                     ▼   Go

         Switch Information Report for sqa12


    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 37.  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. For detailed information on this feature, see
the *Distributed Fabrics User's Guide*.

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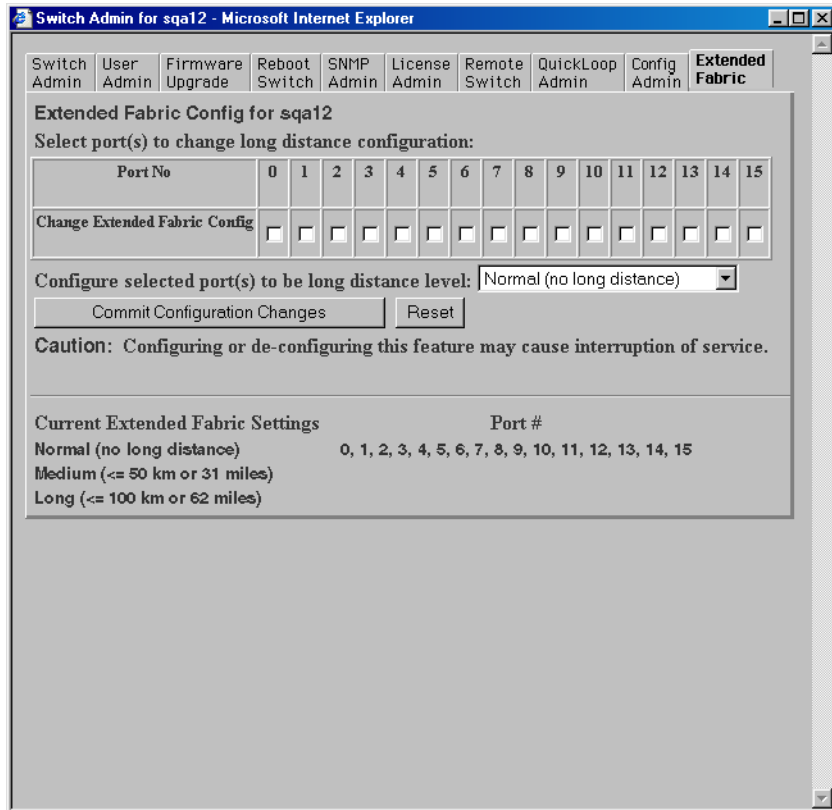


*Figure 38. Extended Fabric Tab*

Following is a description of the fields on the Extended Fabric tab:

Port No                Port Number.

Change Extended     Check to designate the ports for which you want to
Fabric              change the long distance configuration.
Configuration

| | |
|---|---|
| Configure selected port(s) to be long distance level | Select 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 | Click to apply configuration for Extended Fabrics. |
| Reset | Click to reset all fields to values present when Extended Fabrics was launched. |
| Current Extended Fabric Settings | Displays current settings by port number. |

# Telnet Interface

Only one Telnet session can be active at a time.

---

**Note**   The Telnet Interface requires administrative privileges. Once an administrative login is entered, administrative privileges remain available until the web browser is exited.

---

To access the Telnet Interface:

1. Launch a web browser.

2. Enter the switch name or IP address in the Location/Address field and press Enter. For example:  **http://***Switchname***/**.

   Web Tools launches, displaying Fabric View.

3. Click the Telnet icon on the switch panel.

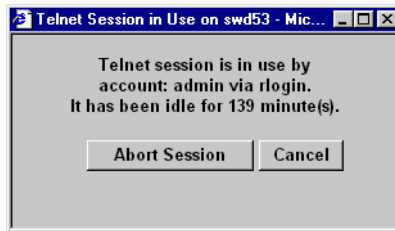   If a Telnet session is already active, the following message displays:



*Figure 39.  Telnet Session in Use Message*

4. If this message displays and you want to abort the active session, click Abort Session. Otherwise, click Cancel.

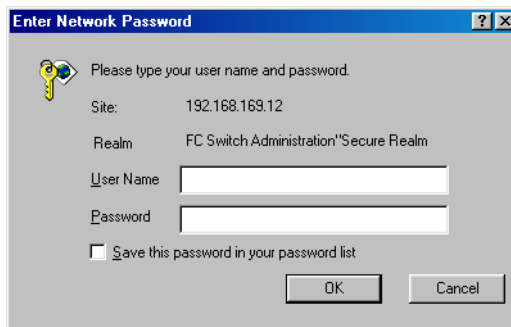   If there is no active session or it has been aborted, the following dialog appears:



*Figure 40.  Enter Network Password Dialog Box*

5. Enter your user name and password (the account used must have administrative privileges).

6. Specify whether you want the password saved.
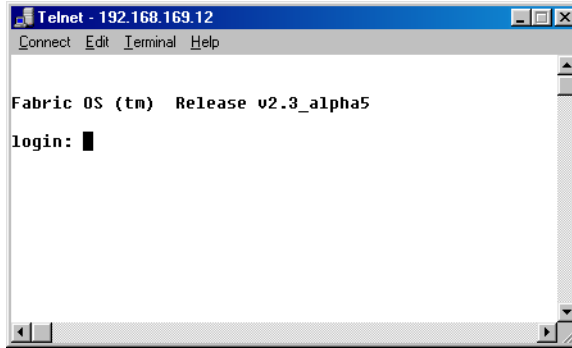
7. Click OK.



*Figure 41.  Telnet Interface*

# GLOSSARY

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| **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. |
| **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 Address Identifier** | An address identifier recognized by a port in addition to its standard identifier. An alias address identifier may be shared by multiple ports. |
| **Alias AL_PA** | An AL_PA value recognized by an L_Port in addition to the AL_PA assigned to the port. See also *AL_PA*. |
| **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. Similar to a "shared bandwidth ring" on a network. |
| **Arbitrating State** | The state in which a port has become the loop master. This state is only available from the Open state. |
| **ASIC** | Application-Specific Integrated Circuit. |

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| **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. |
| **AW_TOV** | Arbitration Wait Timeout Value. The minimum time an arbitrating L_Port waits for a response before beginning loop initialization. |
| **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*. |
| **Beginning Running Disparity** | The disparity at the transmitter or receiver when the special character associated with an ordered set is encoded or decoded. See also *Disparity*. |
| **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 synch-ronization** | The delivery of correctly clocked bits at the required BER. See also *BER*. |
| **Block** | As applied to fibre channel, upper level application data that is transferred in a single sequence. |
| **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*. |
| **Cascade** | Two or more interconnected fibre channel switches. For 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 non-delivery. |

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| **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 4** | Connection-oriented service that provides a virtual circuit between two ports, including notification of delivery or non-delivery. Allows fractional parts of the bandwidth to be used in a virtual circuit. |
| **Class 6** | Connection-oriented service that provides a multicast connection between the multicast originator and recipients, including 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. |
| **CLS** | Close Primitive Signal. The protocol used by a port in an arbitrated loop to close a circuit. |
| **Code Balance** | The ration of one bit to the total number of transmitted bits. |
| **Comma** | Unique pattern (either 1100000 or 0011111) used in 8b/10b encoding to specify character alignment within a data stream. See also *K28.5*. |
| **Community (SNMP)** | Relationship between a group of SNMP managers and an SNMP agent, in which authentication, access control, and proxy characteristics are defined. |
| **Connection Initiator** | A port that has originated a Class 1 dedicated connection and received a response from the recipient. |
| **Connection Recipient** | A port that has received a Class 1 dedicated connection request and transmitted a response to the originator. |
| **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 *BB_Credit* and *EE_Credit*. |
| **CT_HDR** | Common transport header. A header that conforms to the Fibre Channel Common Transport (FC_CT) protocol. |

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| **CT_IU** | Common transport information unit. An information unit that conforms to the Fibre Channel Common Transport (FC_CT) protocol. |
| **Current Fill Word** | The fill word currently selected by the LPSM (loop port state machine). See also Fill Word. |
| **Cut-through** | Switching technique that allows selection of a transmission route for a frame as soon as destination address is received. See also *Route*. |
| **Data word** | Type of transmission word that occurs within frames. The frame header, data field, and CRC all consist of data words. See also *Frame*, *Ordered set*, *Transmission word*. |
| **Defined configuration** | The complete set of all zone objects defined in the fabric; can include multiple zone configurations. See also *Enabled configuration*, *Zone configuration*. |
| **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. |
| **Distributed Fabrics** | The combined user's guides for Extended Fabrics and Remote Switch. Not a software product. |
| **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** | Unique identifier for the switch in a fabric. Usually automatically assigned by the switch, but can also be assigned manually. Can be any value between 1 and 239. |
| **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_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*. |
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| **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** | Product that allows interconnection of fibre channel fabric over distances of up to 100 kilometers. |
| **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 *FL_Port*, *Fx_Port*. |
| **Fabric** | A fibre channel network of two or more switches. Also called a "switched fabric." See also *SAN*, *Cascade*. |
| **Fabric name** | Unique 64-bit identifier assigned to each separate fabric. Communicated during login and port discovery. |
| **Fabric OS** | Proprietary operating system on switches. |
| **Fabric Watch** | 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. |

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| **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 *FSP*. |
| **FIFO** | First In, First Out. May refer to a data buffer that follows the first in, first out rule. |
| **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*. |
| **FS_ACC** | Fibre channel services accept. The information unit used to indicate acceptance of a request for a fibre channel service. |
| **FS_IU** | Fibre channel services information unit. An information unit that has been defined by a specific fibre channel service. |
| **FS_REQ** | Fibre channel services request. A request for a fibre channel services function, or notification of a fabric condition or event. |

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| **FS_RJT** | Fibre channel services reject. An indication that a request for fibre channel services could not be processed. |
| **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. 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_Port*, *FL_Port*. |
| **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. |
| **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. |
| **Hardware Translative Mode** | A method for achieving address translation. The following two hardware translative modes are available to a QuickLoop enabled switch: <br> • Standard Translative Mode: Allows public devices to communicate with private devices that are directly connected to the fabric. <br><br> • QuickLoop Mode: Allows initiator devices to communicate with private or public devices that are not in the same loop. |

| **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. |
| **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*. |
| **IN_ID** | Initial identifier. The field in the CT_HDR where the port ID of the client originator of a Fibre Channel Services request. |
| **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. |
| **IPA** | Initial process associator. An identifier associated with a process at an N_Port. |
| **ISL** | Interswitch Link. Fibre channel link from the E_Port of one switch to E_Port of another. See also *E_Port*, *Cascade*. |
| **Isolated E_Port** | A port that is online but not operational between switches due to overlapping domain ID or nonidentical parameters such as E_D_TOVs. |
| **IU** | Information Unit. An individual set of information as defined by higher level process protocol definition, or upper-level protocol mapping. |
| **JBOD** | Just a Bunch Of Disks. A number of disks connected in a single chassis to one or more controllers. See also *RAID*. |
| **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_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. |

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| **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*. |
| **LIS_HOLD_TIME** | The maximum period of time for a node to forward a loop initialization sequence |
| **LM_TOV** | Loop Master Timeout Value. The minimum time that the loop master waits for a loop initialization sequence to return. |
| **Login BB_Credit** | The number of receive buffers a receiving L_Port has available when a circuit is first established. Communicated through PLOGI, PDISC link services, or FLOGI. |
| **Loop Circuit** | A temporary bidirectional communication path established between L_Ports. |
| **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*. |
| **MIB** | Management Information Base. SNMP structure that provides configuration and device information to assist with device management. |
| **Monitoring State** | The state in which a port is monitoring the flow of information for data relevant to the port. |

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| **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_Port** | Node Port. Port that can attach to a fibre channel port. See also *NL_Port*, *Nx_Port*. |
| **NAA** | Network address authority. An identifier that indicates the format of a network address. |
| **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. |
| **Open Originator** | The L_Port that wins arbitration in an arbitrated loop and sends an OPN ordered set to the destination port, then enters the Open state. |
| **Open Recipient** | The L_Port that receives the OPN ordered set from the open originator, and then enters the Open state. |
| **Open State** | The state in which a port can establish a circuit with another port. A port must be in the Open state before it can arbitrate. |
| **OPN** | Open Primitive Signal. The protocol used by a port that has won arbitration in an arbitrated loop to establish a circuit. |

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| **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). |
| **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 *Non-participating mode*. |
| **Path Selection** | The selection of a transmission path through the fabric. Switches use the FSPF protocol. |
| **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 *FLOGI*. |
| **Point-to-point** | Two fibre channel devices connected by a direct link. See also *Topology*. |
| **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. |

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| **Public loop** | An arbitrated loop attached to a switch. |
| **QuickLoop** | Can indicate either the 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 QuickLoop technology. All devices in a QuickLoop share a single AL_PA space and behave as if they are in one loop. |
| **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*. |
| **Remote Switch** | Product that enables two switches to connect over an ATM connection. Requires compatible fibre channel-to-ATM gateways. Can be up to 10 kilometers distance between each switch and respective gateway. |
| **Request Rate** | The rate at which requests arrive at a servicing entity. See also *Service Rate*. |
| **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*. |
| **RR_TOV** | Resource Recovery Timeout Value. The minimum time a target device in a private loop must wait after a LIP before logging out a SCSI initiator. See also *E_D_TOV*, *R_A_TOV*. |
| **RSCN** | Registered State Change Notification. Switch function that sends notification of fabric changes from the switch to specified nodes. |
| **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*. |
| **Service Rate** | The rate at which an entity can service requests. See also *Request Rate*. |
| **SI** | Sequence Initiative. |
| **Single mode** | Fibre-optic cabling standard that provides for distances of up to 10 kilometers between devices. |

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| **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 UDP for transport layer functions, or TCP/IP for both. See also *Community (SNMP)*. |
| **SNMPv1** | The original standard for SNMP, now labeled v1. |
| **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 *Switch Domain_ID*. |
| **Switch Port** | Port on a switch. Switch ports can be E_Ports, F_Ports, or FL_Ports. |
| **SWL** | Short wavelength fiber-optic cable. Based on 850 nm lasers supporting 1.0625 Gbps link speeds. Connectors are color-coded black. See also *LWL*. |
| **Target** | Storage device that receives communications from a server or workstation over a fibre channel network. See also *Initiator*. |
| **Tenancy** | The time from when a port wins arbitration in a loop until the same port returns to the monitoring state. Also referred to as loop tenancy. |
| **Throughput** | The rate of data flow achieved within a cable, link, or system. See also *Bandwidth*. |
| **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. |
| **Transfer State** | A state in which a port can establish circuits with multiple ports without reentering the arbitration cycle for each circuit. This state can only be accessed by an L_Port in the Open state. |
| **Translative mode** | Mode in which public devices can communicate with private devices across fabric.Translates 8-bit to 24-bit addresses. |

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| **Transmission Character** | A 10-bit character encoded according to the rules of the 8b/10b algorithm. See also *8b/10b encoding*, *Transmission word*. |
| **Transmission Word** | Group of four transmission characters, totaling 40 bits. Two types: data words and ordered sets. See also *Data word*, *Ordered set*, *Transmission character*. |
| **Trap (SNMP)** | Message sent by SNMP agent to inform SNMP management station of critical error. See also *SNMP*. |
| **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_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. |
| **UDP** | User Datagram Protocol. A protocol that runs on top of IP and provides port multiplexing for higher layer protocols. |
| **ULP** | Upper Layer Protocol. Protocol that runs on top of fibre channel. Typical upper layer protocols: SCSI, IP, HIPPI, IPI. |
| **ULP_TOV** | Upper Level Timeout Value. The minimum time that a SCSI ULP process waits for SCSI status before initiating ULP recovery. |
| **Unicast** | Transmission of data from a single source to single destination. See also *Broadcast*, *Multicast*. |
| **Web Tools** | Product that provides a graphical interface for monitoring and managing individual switches or entire fabrics from standard workstations. |
| **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. |
| **Xmitted Close State** | The state in which an L_Port cannot send messages, but can retransmit messages within the loop. A port in the XMITTED CLOSE state cannot attempt to arbitrate. |

**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".

**Zone configuration**

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

**Zoning**

Product that allows partitioning of fabric into logical groupings of devices. See also *Zone*.

# INDEX