

StorageWorks by Compaq

Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0

User Guide

First Edition January 2002
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Compaq Computer Corporation

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About This Guide

This guide describes how to use Fabric Manager to manage your SAN Integrated Switch.

This section covers information about:

- [Naming Conventions, page ix](#)
- [Related Documents, page x](#)
- [Text Conventions, page x](#)
- [Symbols in Text, page xi](#)
- [Getting Help, page xi](#)

Naming Conventions

Throughout this document, references to the *StorageWorks™* Fibre Channel SAN Switch Integrated/32 and Integrated/64 by Compaq, will be designated as follows:

- The term “SAN Integrated Switch” is a generic reference to both or either model.
- The terms “IS/32” or “IS/64” are specific references to either model.

Each of the six individual switches comprising the SAN Integrated Switch will be referred to as either:

- A switch element
- The Fibre Channel SAN Switch 16-EL

The term “switch” refers to any combination of *StorageWorks* Fibre Channel SAN switches, SAN Integrated Switches and switch elements.

Related Documents

Related product information can be found in the following Compaq publications:

Related Documents	
Document Title	Part Number
<i>Fibre Channel SAN Switch 16-EL Installation and Hardware Guide</i>	AA-RNAPC-TE
<i>Fibre Channel SAN Switch Integrated/32 and Integrated/64 Installation and Hardware Guide</i>	AA-RPDFC-TE
<i>Command Console for Hubs, Switches, and Tape Controllers Getting Started Guide</i>	AA-RHDAD-TE
<i>Fibre Channel SAN Switch Management Guide</i>	AA-RMMJB-TE

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
<i>FILENAMES</i>	File names appear in italic, initial capital letters, except when case-sensitive.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in upper case. NOTE: UNIX commands are case sensitive and will not appear in uppercase.
Type	When you are instructed to <i>type</i> information, type the information without pressing the Enter key.
Enter	When you are instructed to enter information, type the information and then press the Enter key.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week.

NOTE: For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Phone Support Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq Website. Access the Compaq Website by logging on to the Internet at <http://www.compaq.com>.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level
- Detailed, specific questions

Compaq Website

The Compaq Website has the latest information on this product as well as the latest drivers. You can access the Compaq Website by logging on to the Internet at <http://www.compaq.com/storage>.

Compaq Authorized Reseller

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq Website for locations and telephone numbers.

Chapter 1

Introducing Fabric Manager

Fabric Manager provides a Graphical User Interface (GUI) that allows the administrator to monitor and manage SAN Integrated Switches and their individual switch elements.

This chapter provides the following information:

- [Overview, page 1-1](#)
- [Views Available in Fabric Manager, page 1-3](#)

Overview

Fabric Manager provides a GUI that allows the administrator to monitor and manage a SAN Integrated Switch from a standard workstation. Fabric Manager can be used to manage fabric containing multiple SAN Integrated Switches. The six switch elements in a SAN Integrated Switch are represented as a single entity.

Fabric Manager provides high-level information about all SAN Integrated Switches, as well as a view of all other Fibre Channel SAN Switches in the fabric. Fabric Manager launches into the Web Management Tools application when more detailed information is required for an individual SAN switch or switch element. The launching of Web Management Tools is transparent, providing a seamless user interface. In addition to viewing the switch elements in a SAN Integrated Switch as a single entity, Fabric Manager provides improved performance of the SAN Integrated Switch over Web Management Tools alone.

IMPORTANT: If Web Management Tools is launched directly, rather than through Fabric Manager, switch elements in the SAN Integrated Switch are represented as six individual switches.

1-2 Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0

Fabric Manager is installed on a workstation, and can be used to manage any SAN Integrated Switches that have firmware version 2.4 or later installed. All switch elements in the SAN Integrated Switch are represented in the main window of Fabric Manager (Figure 3-2, Page 3-3).

NOTE: All switches in the Fabric must have the same version of firmware installed.

Fabric Manager provides:

- Aggregate monitoring and management of SAN Integrated Switches:
 - ❑ The aggregate status of the six switch elements in the SAN Integrated Switch.
 - ❑ Access to detailed information for each switch element in the SAN Integrated Switch.
- Monitoring and management of all the Fibre Channel SAN switches in the fabric.
 - ❑ The status of all switches in the fabric.
 - ❑ Access to event logs for all switches.
 - ❑ Zoning functions.
 - ❑ Loop diagnostics and query and control of loop interfaces to aid in locating faulty devices.
 - ❑ Ability to name and zone QuickLoops.
 - ❑ Access to the Name Server Table.
 - ❑ Telnet functions.
 - ❑ Switch beaconing for rapid identification in large fabric environments.

From Fabric Manager, you can seamlessly view detail-level information including:

- Monitoring and management of individual switches in the fabric:
 - ❑ 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 and management of individual switch 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 Fabric Manager

Fabric Manager provides information about and access to the SAN Integrated Switch through a series of separate windows, making it possible to view several aspects of the fabric at the same time. [Table 1-1](#) lists a summary of the views available in Fabric Manager.

Table 1-1: Fabric Manager Views

Initial Display When Fabric Manager is Launched	
Fabric View	<p>Includes 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.</p> <p>Each panel contains an icon that represents a switch or SAN Integrated Switch, in addition to icons for Switch Events and the Administrative and Telnet interfaces. The background color of the switch icon represents the status of a particular switch, switch element or SAN Integrated Switch (as defined by the legend provided in the window). Fabric View also provides access to fabric-wide options such as zoning via Web Management Tools.</p> <p>Switch status is calculated approximately once per second; however, the initial calculation does not occur until 30 to 60 seconds after the switch is started. For any status based on errors per time interval, any errors will cause the status to show faulty until the entire sample interval has passed.</p>

Table 1-1: Fabric Manager Views (Continued)

Accessible from the Fabric View	
Fabric Events View	Displays the error log for the fabric, which is the combination of the error logs of all the switches in the fabric. Accessed by clicking the Fabric Events button on the control panel.
Fabric Topology View	Displays physical configuration, including active domains, paths, and routing information of switches in the SAN. Accessed by clicking the Fabric Topology button on the control panel.
Name Server Table View	Displays the Name Server Table for the fabric. Use to view information about the devices attached to the fabric. Accessed by clicking the Name Server button on the control panel.
Zone Administration View	Provides an interface to Zoning, including zone settings, zone aliases, QuickLoops, and zone configurations. Accessed by clicking the Zone Admin button on the control panel.
Fabric Manager Log	Provides a record of system events and error messages.
Summary View/ Detail View	Toggles between summarized and detailed versions of Fabric View.
SAN Integrated Switch Information	Displays a panel for each SAN Integrated Switch, with the status of each switch element indicated by the background color of the corresponding switch element icon. The detailed information provided corresponds to whatever switch is currently selected. This view is accessed from Fabric View by clicking the SAN Integrated Switch icon on the SAN Integrated Switch panel. Once the SAN Integrated Switch View is launched, switch element views for the individual switches in the SAN Integrated Switch can be accessed by clicking individual switch element icons.
Switch Information	Displays information about individual switches, including a real-time view of switch status. Accessed by clicking a switch icon in the SAN Integrated Switch View or in Fabric View. The Switch View is also the launch point for the Switch Events View, Telnet Interface, Fabric Watch View, Administrative Interface, Performance View, and Port Information View. It includes icons that display the status of the switch fans, temperature monitors, and beacon.
Switch Events View	Displays the error log for the switch. Accessed by clicking the Events icon on the switch panel. This view can also be accessed through Switch View.
Administrative Interface	Provides an interface for performing functions such as upgrading firmware versions or reconfiguring a switch. Accessed by clicking the Admin icon on the switch panel. This view can also be accessed through Switch View.

Table 1-1: Fabric Manager Views (Continued)

Telnet Interface	Provides an interface for using Telnet commands for switch diagnostics, troubleshooting, and fabric management. Accessed by clicking the Telnet icon on the switch panel. This view can also be accessed through Switch View.
Accessible From the SAN Integrated Switch View	
SAN Integrated Switch – Individual Switch View	Displays information about an individual switch element in the SAN Integrated Switch, including a real-time view of switch status. Accessed by clicking the switch element icon from within the SAN Integrated Switch View. This 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.

NOTE: Switch View and its associated subviews can be accessed by clicking on any switch or switch element in Fabric Views or SAN Integrated Switch View. See *Managing the Switch with Web Management Tools* in the *Compaq StorageWorks Fibre Channel SAN Switch Management Guide* for detailed information on this view.

Chapter 2

Installing Fabric Manager

This chapter provides the following information:

- [Requirements, page 2-1](#)
- [Installing, Configuring, and Connecting to Fabric Manager, page 2-3](#)
- [Launching Fabric Manager, page 2-10](#)
- [Adding the Browser Pathname to the Properties File, page 2-12](#)
- [Uninstalling Fabric Manager, page 2-12](#)

Requirements

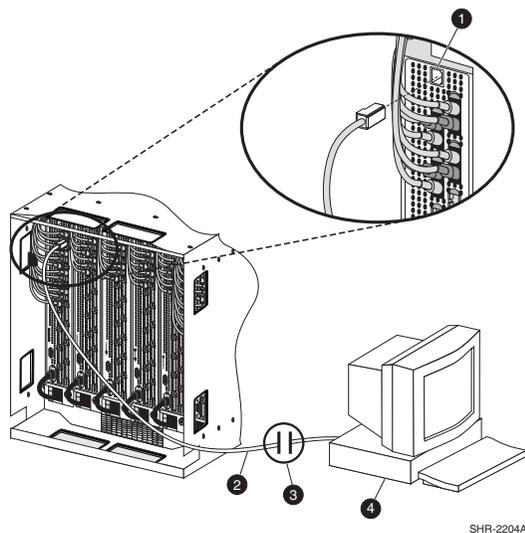
The computer workstation and the switch must both meet the following specific requirements for the correct installation and operation of Fabric Manager.

Switch Requirements

Fabric Manager can be used to manage or provide access to Compaq StorageWorks Fibre Channel SAN switches that meet the following requirements:

- Fibre Channel SAN Switch models 8, 16, 8-EL, 16-EL, IS/32, and IS/64.
- Firmware version 2.4 or later.
- Six unused IP addresses, one for each switch element
- Six Ethernet cables for connecting between the workstation and the SAN Integrated Switch (through a router, hub or concentrator). See [Figure 2-1](#).

2-2 Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0



- 1 RJ-45 Ethernet ports in each switch element for management through Fabric Manager
- 2 Ethernet cables attached to each switch element
- 3 Representation of a LAN
- 4 Workstation running Fabric Manager

NOTE: Only one cable is shown for the sake of simplicity. In reality, each switch element would have a cable attached to its RJ-45 Ethernet port.

Figure 2-1: Managing the SAN Integrated Switch with Fabric Manager

Workstation Requirements

The following items are required for the correct installation and operation of Fabric Manager on the computer workstation:

- One of the following operating systems:
 - Windows 2000
 - Windows NT 4.0
- Adequate RAM:
 - 128 MB for fabrics containing 21 or fewer switches
 - 256 MB for fabrics containing more than 21 switches
- 10 MB of free disk space
- One of the following Web browsers:
 - Internet Explorer 4.01 or later
 - Netscape Communicator 4.51 or later

NOTE: The browser must be specifically configured to work with Fabric Manager. For information about how to do this, see [Configuring the Web Browser, page 2-3](#).

- Java Plug-in version 1.3
- One Ethernet connection to each SAN Integrated Switch element (via a router, hub or concentrator)

Installing, Configuring, and Connecting to Fabric Manager

Preparing to use Fabric Manager to manage your fabric requires the following steps:

- [Connecting the Ethernet Cables, page 2-3](#)
- [Installing a Web Browser, page 2-3](#)
- [Configuring the Web Browser, page 2-3](#)
- [Installing the Java Plug-in on the Workstation, page 2-5](#)
- [Installing Fabric Manager on the Workstation, page 2-6](#)

Connecting the Ethernet Cables

In order to manage the SAN Integrated Switch through Fabric Manager, each switch element must have a valid Ethernet IP address. To configure the IP addresses and connect the Ethernet cables, refer to the *Compaq StorageWorks SAN Switch Integrated/32 and Integrated/64 Installation and Hardware Guide*.

Installing a Web Browser

Install one of the following browsers, if not already installed.

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

Configuring the Web Browser

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

Configuring Internet Explorer

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

2-4 *Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0*

The browser cache must be cleared after the installation of the firmware. The browser may use local cache copies of jar files and/or image files to improve performance (depending on options selected in the browser), which can cause incorrect display. To remove cached files from Internet Explorer.

1. Select Internet Options from the View menu if using Internet Explorer 4.x, or from the Tools menu if using 5.x.
2. Select the General tab.
3. Click Delete Files... (under Temporary Internet Files).
4. Click OK.
5. Exit and relaunch the browser.

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

1. Select Internet Options from the View menu if using Internet Explorer 4.x, or from the Tools menu if using 5.x.
2. 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."
4. Click OK.

For Windows NT, the correct Browser Process Model must be selected. To select the Browser Process Model:

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

Configuring Netscape Communicator

The Web browser cache must be cleared after the installation of the firmware. Use these step 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 launch the browser again.

Installing the Java Plug-in on the Workstation

A Java Plug-in must be installed on the workstation for the Fabric Manager installer to function. Windows 2000 and Windows NT workstations require Java Plug-in version 1.3.

The software eliminates differences between the two supported Web browsers: Netscape Navigator and Microsoft Internet Explorer. The Java Plug-in software allows Java applets used by the Fabric Manager program to run using Sun's Java Runtime Environment (JRE), instead of the browser's default Java virtual machine. The JRE provides consistency and reliability when running applets. Java Plug-in works on other operating systems. For more information about Java Plug-in support for other operating systems, refer to the manual that came with your operating system. For more information on Java Plug-in, go to:

<http://java.sun.com/products/plugin/index.html>

Checking the Version of the Java Plug-in

Use these steps to check the Java Plug-in version installed.

1. Look on the Add/Remove Programs list:
 - a. Go to the Start menu, choose Start > Settings > Control Panel > Add/Remove Programs.
 - b. Double-click the Add/Remove Programs folder.
 - c. Scroll down to the Java file. The version number will show at the end of the file name. For example:

Java 2 Runtime Environment Standard Edition v1.2.2 or
Java 2 Runtime Environment Standard Edition v1.3.0_02

2-6 Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0

2. Follow step a, b, or c depending on the Java Plug-in version is installed.
 - a. If the correct version is installed, Fabric Manager is ready for use. Windows 2000 and Windows NT workstations require Java Plug-in version 1.3.
 - b. If an outdated version is currently installed, uninstall it using the Add/Remove Programs feature from your control panel, and follow the instructions for [Installing the Java Plug-in on Windows, page 2-6](#).
 - c. If no Java Plug-in is installed, install the plug-in by following the instructions for [Installing the Java Plug-in on Windows, page 2-6](#).

Installing the Java Plug-in on Windows

To install the Java Plug-in on Windows 2000, or NT:

1. Insert the Fabric Manager CD into your CD-ROM drive.
2. Go to the JRE directory.
3. Locate the Java Plug-in *.exe* file, and double-click.
4. Follow the instruction provided during the installation.

Installing Fabric Manager on the Workstation

To install Fabric Manager:

1. Insert the Fabric Manager CD-ROM in the CD drive of the computer workstation. The installer automatically launches.

NOTE: If Fabric Manager does not automatically launch from the CD-ROM, click *setup.exe* from the list of files on the Fabric Manager CD-ROM.

If Fabric Manager is already installed on the computer, a window displays at this point to indicate this. If this window displays, you can either exit the installer and uninstall the existing version, or click Next to continue with the installation.

NOTE: If you decide to continue with the installation and select the same location, all the existing files are overwritten, except for the *FabricManager.Properties* file. The *FabricManager.Properties* file contains the selections from the previous installation, and is saved as *FabricManager.Properties.old*.

The Welcome window displays, providing product information and version.

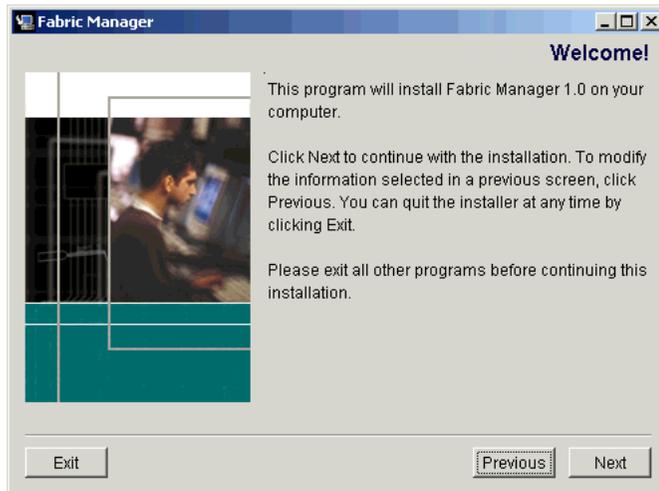


Figure 2-2: Fabric Manager Welcome window

2. Click Next. The installer searches the local system for the correct version of the Java Plug-in.
 - If the correct version is not installed, a window displays a warning that the correct version of the plug-in is missing. If the installer warns that the plug-in is missing, perform [Step 3](#), below, before continuing.
 - If the correct version is installed, the installation will proceed with [Step 4](#).
3. If the installer warns that the Java Plug-in is missing:
 - a. Click Exit to close the Fabric Manager installer, then click Exit Install in the warning dialog that displays.
 - b. View the local drives, right-click on the icon for the Fabric Manager CD-ROM, and select Explore.
 - c. Click to open the JRE folder, then click on the `.exe` file.
 - d. The plug-in installer launches.
 - e. Read the license agreement, and click Next if you accept the agreement.
 - f. A window displays to allow selection of the installation location.
 - g. Click Next to accept the default installation location, or browse for a custom location and then click Next.

2-8 *Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0*

4. The Web Browser Requirements window displays (see [Figure 2-3](#)). Determine whether a compatible browser is installed. If a compatible browser is not installed, exit the Fabric Manager installation, install the browser, and then relaunch the Fabric Manager installer.

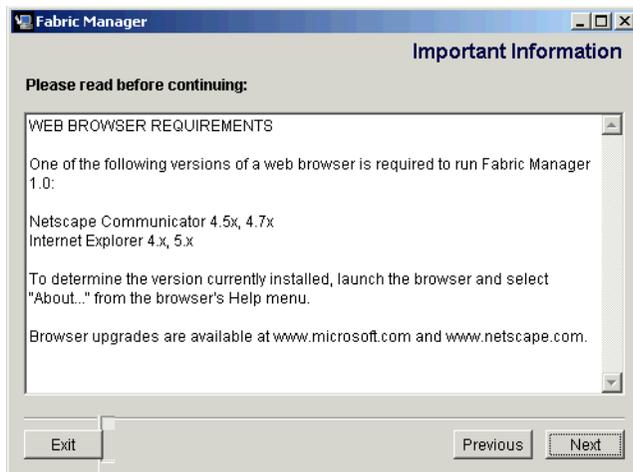


Figure 2-3: Web Browser Requirements window

NOTE: The browser should be installed before Fabric Manager is installed so that the pathname for the browser can be written to the *FabricManager.Properties* file.

5. Click Next to continue. The Select Destination Folder window displays (see [Figure 2-4](#)).



Figure 2-4: Select Destination Folder window

6. Click Install to accept the default installation location, or browse for a custom location and then click Install.

Once Install is clicked, a window showing the progress of the installation displays, with the name of the file currently being installed in the lower portion of the window.

The installer searches the registry for the Web browser and adds the complete pathname to the *FabricManager.Properties* file. If the installer is unable to locate a Web browser, a window displays warning that no browser was found. If this window displays, exit the Fabric Manager installation, install the browser, and then relaunch the Fabric Manager installer.

NOTE: If the browser is installed or moved after Fabric Manager is installed, see [Adding the Browser Pathname to the Properties File, page 2-12](#).

Once the installation of Fabric Manager is complete, the following window displays:

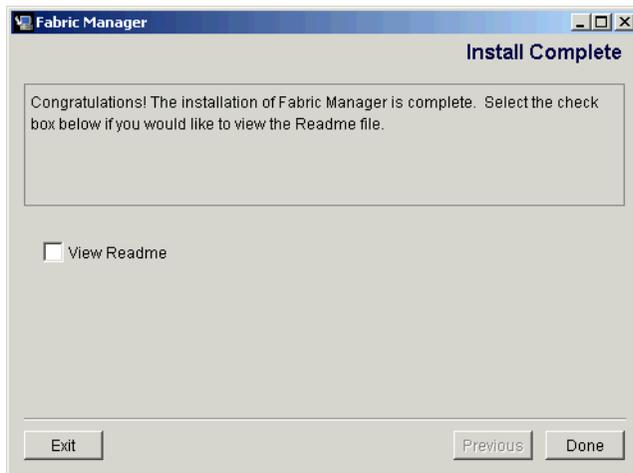


Figure 2-5: Install Complete window

7. Select the check box if you want to view the *ReadMe* file, then click Done to close the installer.

NOTE: Clicking Exit at this point does not undo the installation, but does prevent the *ReadMe* file from being displayed, even if the View Readme checkbox is selected.

Launching Fabric Manager

You can launch Fabric Manager once Fabric Manager, the Java Plug-in, and a Web browser are installed on the workstation, and a Web Management Tools license is installed on the switch.

To launch Fabric Manager:

1. Select Start > Programs > Fabric Manager > Fabric Manager. The URL window displays (see [Figure 2-6](#)).

NOTE: You can resize the URL window to save screen space. Next time you open Fabric Manager, the new size will display.

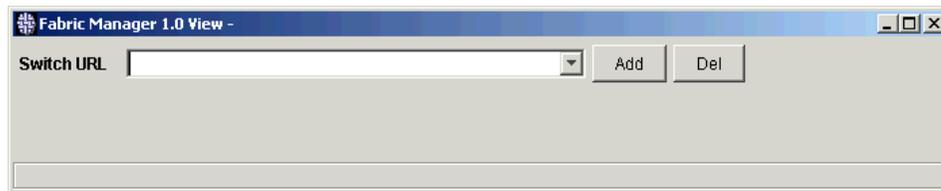


Figure 2-6: URL Window

2. Enter the switch name or IP address in the Switch URL field.

NOTE: If you want information specific to QuickLoop to be available, the QuickLoop switch must be the local domain. The Local domain is the switch IP address which you specify in the URL window.

3. Click Add to add the address or switch name in the Switch URL field to the drop-down list. To remove an address from the drop-down list, select that address and click Del.
4. Press the **Enter** key to submit the address.

NOTE: If an incorrect address or format is used, an error message displays. If an error message displays, determine and enter the correct address.

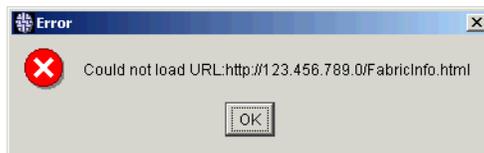


Figure 2-7: Address Error dialog box

Once a correct address is entered, Fabric Manager launches. The default view (Fabric View) displays. For more information about using Fabric Manager, see [Using Fabric Manager, page 3-1](#).

Adding the Browser Pathname to the Properties File

If the browser is installed after Fabric Manager is installed, the properties file must be edited to show the correct path for the browser.

NOTE: Editing any information other than the browser pathname in the properties file is not recommended.

To add the browser pathname to the properties file:

1. Open the directory where Fabric Manager is installed. The default directory is C:\Program Files\Fabric Manager\, where “C” is the local drive.
2. Double-click on the *FabricManager.Properties* file, and select a text editor (such as Notepad) as the application for this file.
3. Enter a new line starting with `BrowserPath=“xxx”`, where “xxx” (in quotes) is the correct pathname for the browser. For example:

```
BrowserPath=“C:\\Program Files\\Internet Explorer\\iexplore.exe”
```

This line can be added anywhere in the file, provided it does not interrupt another line.

Uninstalling Fabric Manager

NOTE: The uninstaller can access only the most recent installation. To uninstall an additional installation, open the corresponding installation folder, open the subdirectory *UninstallerData*, and double-click *Uninstall FabricManager.exe* to launch the uninstaller.

To uninstall Fabric Manager:

1. Select Start > Settings > Control Panel.
2. Double-click Add/Remove Programs.
3. On the Install/Uninstall tab of the Add/Remove Programs Properties window, select Fabric Manager and click Add/Remove. A window displays warning that you are about to uninstall Fabric Manager.
4. Click Uninstall to continue.
5. A window showing the progress of the program removal displays. When the removal is complete, the Uninstall Complete window displays.
6. Click Exit to close the Uninstall Complete window.

Chapter 3

Using Fabric Manager

This chapter describes the views and interfaces available through Fabric Manager. The first view that displays is Fabric View which provides a gateway to all the other views. The sections of Fabric View consist of the following:

- [Control Panel and Associated Views, page 3-8](#)
- [SAN Integrated Switch Panel and Associated View, page 3-10](#)
- [Individual Switch Panel and Associated Views, page 3-12](#)

Switch elements in the SAN Integrated Switch can be accessed simultaneously from different connections and by different methods, such as Telnet, SNMP, and through Web Management Tools. To ensure that any modifications are correctly applied, verify that the switch is being modified from any other connection at the same time.

Fabric View

Fabric View is the first view that displays when you connect to a SAN Integrated Switch through Fabric Manager. Fabric View provides access to specific information about the switches in the fabric through a panel representing each standalone switch and each SAN Integrated Switch. It also provides a control panel and a legend explaining the colors that are used to indicate status on the switch panels.

3-2 Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0

To launch Fabric Manager and access Fabric View:

1. Select Start > Programs > Fabric Manager > Fabric Manager. The URL window displays (see [Figure 3-1](#)).



Figure 3-1: URL Window

2. Enter the switch name or IP address in the Switch URL field.
NOTE: If you want information specific to QuickLoop to be available, the QuickLoop switch must be the local domain. The Local domain is the switch IP address which you specify in the URL window.
3. Click Add to add the address or switch name in the Switch URL field to the drop-down list. To remove an address from the drop-down list, select that address and click Del.
4. Press the **Enter** key to submit the address. Fabric Manager launches, displaying the default view, Fabric View (see [Figure 3-2](#)).

NOTE: If an incorrect address or format is used, an error message displays. If an error message displays, determine and enter the correct address. Once a correct address is entered, Fabric Manager launches. The default view (Fabric View) displays.

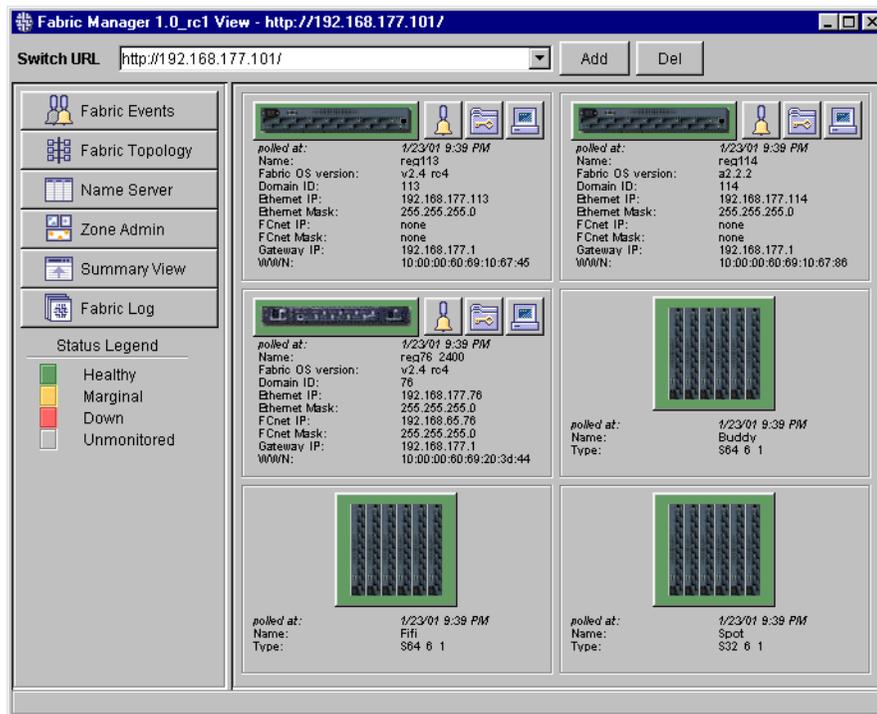


Figure 3-2: Fabric View, detail format

Table 3-1 describes the items visible in Fabric View in Detail format. See Figure 3-3 to see Fabric View in Summary format.

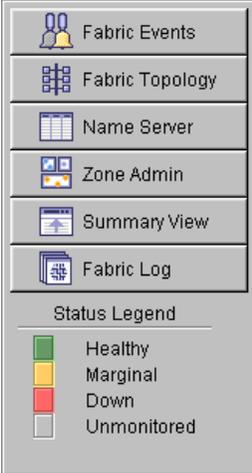
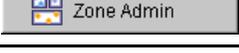
Table 3-1: Fabric View Objects	
Object	Description
Control Panel and Associated Views	
<p>Control Panel</p> 	<p>Provides access to a number of fabric-wide features and includes a legend for interpreting the background color of the Switch icons.</p> <p>The components of the Control Panel are described in the following rows:</p> <ul style="list-style-type: none"> ■ Fabric Events button ■ Fabric Topology button ■ Name Server button ■ Zone Admin button ■ Summary/Detail View button ■ Fabric Log button ■ Status Legend
<p>Fabric Events button</p> 	<p>Click to open Fabric Events View. For information about this view, see Fabric Events View, page 3-9.</p>
<p>Fabric Topology button</p> 	<p>Click to open Fabric Topology View. For information about this view, see Fabric Topology View, page 3-9.</p>
<p>Name Server button</p> 	<p>Click to open Name Server Table View. For information about this view, see Name Server Table View, page 3-9.</p>
<p>Zone Admin button</p> 	<p>Click to open Zone Administration View. For information about this view, see Zone Administration View, page 3-9.</p>

Table 3-1: Fabric View Objects (Continued)

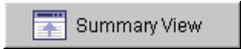
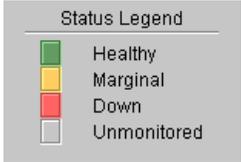
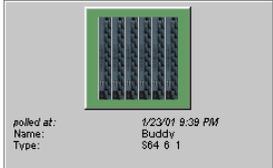
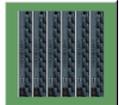
Object	Description
<p>Summary/Detail View button</p> 	<p>Toggle to view Fabric View in either Summary or Detail format. The Summary format shows switch panels with abbreviated information (see Figure 3-3, page 3-8). The default view is Detail.</p>
<p>Fabric Log button</p> 	<p>Click to view the messages in the Fabric Manager Log. For information about this view, see Fabric Manager Log, page 3-10.</p>
<p>Status Legend</p> 	<p>Defines meaning of colors visible in the background of the switch icons. Each color indicates a different operational state.</p> <p>Green Healthy</p> <p>Yellow Marginal (mix of good and faulty readings)</p> <p>Red Down (more than two faulty readings)</p> <p>Gray Unknown or unmonitored</p> <p>If no data is available from a switch, the most recent background color remains displayed.</p> <p>NOTE: For all status readings that are based on errors per time interval, any errors will cause the status to show faulty until the entire sample interval has passed.</p>
SAN Integrated Switch Panel and Associated Views	
<p>SAN Integrated Switch Panel</p> 	<p>The Switch Panel representing a SAN Integrated Switch.</p> <p>The components of the SAN Integrated Switch Panel are described in the following rows.</p> <ul style="list-style-type: none"> ■ SAN Integrated Switch Icon ■ polled at: ■ Name: ■ Type:
<p>SAN Integrated Switch Icon</p> 	<p>Click to open Group View for the SAN Integrated Switch. The background color around the icon indicates the overall status of the Integrated Fabric (for information about this view, see Group View for the SAN Integrated Switch, page 3-10).</p>

Table 3-1: Fabric View Objects (Continued)

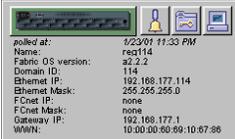
Object	Description
<i>polled at:</i>	Time of the last status check. If the switch is unavailable, this shows the time of the last successful status check.
Name:	The name of the switch.
Type:	Type of SAN Integrated Switch configuration. Types are S64 6 1 (64-port model), or S32 6 1 (32-port model).
Individual Switch Panel and Associated Views	
<p>Individual Switch Panel</p> 	<p>The Switch Panel representing an individual switch element in the fabric. A Switch Panel displays for each individual switch element in the fabric. It also displays if an individual switch in the Switch View of the SAN Integrated Switch is double-clicked.</p> <p>The components of the Individual Switch Panel are described in the following rows.</p> <ul style="list-style-type: none"> ■ Individual Switch Icon ■ Events ■ Admin ■ Telnet ■ polled at: ■ Name: ■ Fabric OS version: ■ Domain ID: ■ Ethernet IP: ■ Ethernet Mask: ■ FCnet IP: ■ FCnet Mask: ■ Gateway IP: ■ WWN:
<p>Individual Switch Icon</p> 	<p>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, page 3-12).</p>

Table 3-1: Fabric View Objects (Continued)

Object	Description
Events 	Click to open Switch Events View to display the Switch Events log (for information about this view, see Switch Events View, page 3-13).
Admin 	Click to open Switch Administration View (for information about this view, see Administrative Interface, page 3-13).
Telnet 	Click to launch the Telnet Interface for the switch (for information about this view, see Telnet Interface, page 3-13).
<i>polled at:</i>	Time of the last status check If the switch is unavailable, this shows the time of the last successful status check.
Name:	The name assigned to switch
Fabric OS version:	The firmware version installed on the selected 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

Figure 3-3 shows the Fabric View in Summary format.

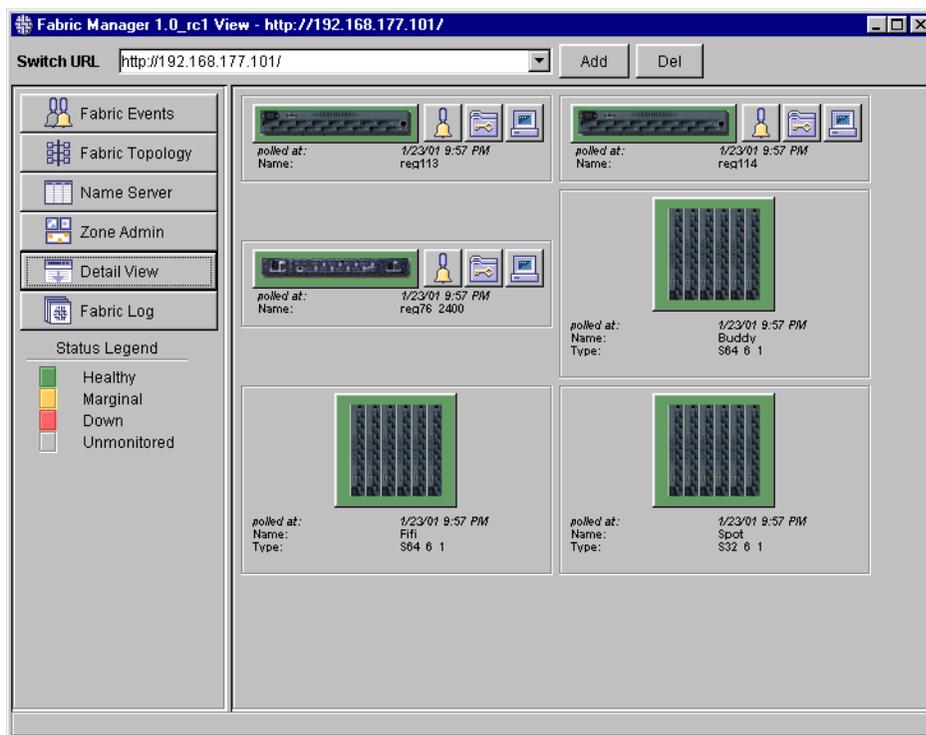


Figure 3-3: Fabric View in Summary Format

Control Panel and Associated Views

Following is a brief description of the views accessible from icons in the Control Panel. See “Managing the Switch with Web Management Tools,” in the *Compaq StorageWorks Fibre Channel SAN Switch Management Guide* for detailed information on each of these views. The views are:

- [Fabric Events View, page 3-9](#)
- [Fabric Topology View, page 3-9](#)
- [Name Server Table View, page 3-9](#)
- [Zone Administration View, page 3-9](#)
- [Fabric Manager Log, page 3-10](#)

Fabric Events View

Fabric Events View provides a log of events for all switches in the fabric. See "Managing the Switch with Web Management Tools" in the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide* for detailed information on this view.

Fabric Topology View

Fabric Topology View summarizes the physical configuration of the fabric from the perspective of the local domain. The local domain is the domain of the switch entered as a URL in the Web browser.

The Fabric Topology View includes information about the destination domains (which are all other domains in the fabric) and the paths between each destination domain and the local domain. See "Managing the Switch with Web Management Tools" in the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide* for detailed information on this view.

Name Server Table View

Name Server Table View provides the name server entries listed in the Simple Name Server database. This view includes all name server entries for the fabric, not only those related to the local domain. Each row in the table represents a different device. See "Managing the Switch with Web Management Tools" in the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide* for detailed information on this view.

Zone Administration View

Zone Administration view provides access to all the zoning functions, and can only be accessed using an administrative account.

NOTE: This view is not updated once it is launched. 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.

For more information about using Zoning, see the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide*, "Understanding and Using Zoning."

Fabric Manager Log

The Fabric Manager Log includes system events and error messages. To access the Fabric Manager Log

1. From Fabric View, click the Fabric Log button.
2. The Fabric Manager Log displays.

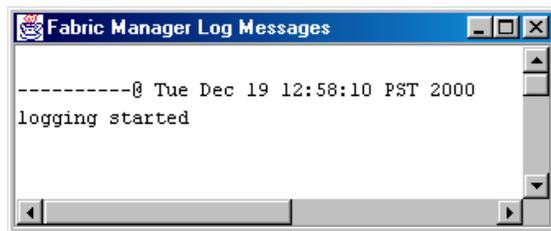


Figure 3-4: Fabric Manager Log

SAN Integrated Switch Panel and Associated View

Following is a description of the Group View for the SAN Integrated Switch, accessible from the SAN Integrated Switch Panel.

Group View for the SAN Integrated Switch

The SAN Integrated Switch Group View represents all six switch elements in the SAN Integrated Switch fabric, and displays when you click a SAN Integrated Switch icon in Fabric View. The background color of each Switch icon in this view indicates the status of that switch, as close as possible to the real-time status of that switch.

To access the SAN Integrated Switch Group View:

1. From Fabric View, click the SAN Integrated Switch icon. The SAN Integrated Switch Group View displays, see [Figure 3-5](#).

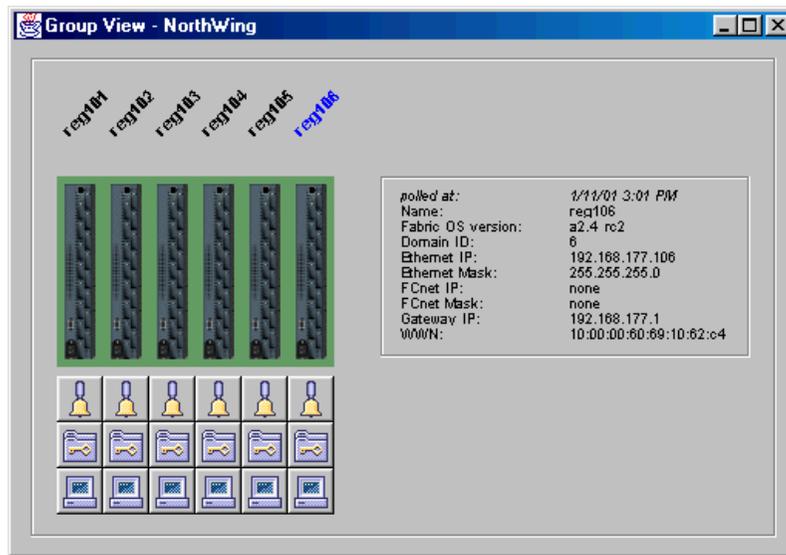


Figure 3-5: SAN Integrated Switch Group View

- Click on the switch element icon for which you want to view detailed information. The information that displays to the right of the panel is updated for the selected switch. In [Figure 3-5](#), information is being displayed for the switch named reg106.

NOTE: Switch View for an individual switch in the SAN Integrated Switch can be accessed from this panel by double-clicking the corresponding Switch icon in SAN Integrated Switch panel.

[Table 3-2](#) lists the information in the SAN Integrated Switch Group View.

Table 3-2: SAN Integrated Switch Group View

Field	Description
Switch Icons	Click to open Switch View for the selected switch. The background color around the icon indicates the status of the switch (for information about Switch View, see Switch View, page 3-12).
Switch Names (listed above the Switch icons)	The name of each switch is listed above the corresponding switch icon.
polled at:	The date and time at which the selected switch was last polled.
Name:	The name of the selected switch.
Fabric OS version:	The firmware version installed on the selected switch.
Domain ID:	The domain number of the selected switch; a number that uniquely identifies the switch in the fabric.

Table 3-2: SAN Integrated Switch Group View (Continued)

Field	Description
Ethernet IP:	The Ethernet IP address of the selected switch
Ethernet Mask:	The Ethernet mask value of the selected switch
FCnet IP:	The Fibre Channel IP address of the selected switch
FCnet Mask:	The Fibre Channel net mask value of the selected switch.
Gateway IP:	The IP address of default gateway of the selected switch. Must be properly set to access switch from other networks.
WWN:	Unique numeric assigned by manufacturer.

Individual Switch Panel and Associated Views

The following section describes views accessible from the Individual Switch Panel.

- [Switch View, page 3-12](#)
- [Switch Events View, page 3-13](#)
- [Administrative Interface, page 3-13](#)
- [Telnet Interface, page 3-13](#)

IMPORTANT: See “Managing the Switch with Web Management Tools” in the *StorageWorks by Compaq Fibre Channel SAN Switch Management Guide* for detailed information on each of the following views.

Switch View

Switch View displays when you click a Switch icon in Fabric View or one of the switch elements in the [Group View for the SAN Integrated Switch](#) (see [Figure 3-5](#)). 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 calculated approximately once per second; however the initial calculation does not occur until 30 to 60 seconds after the switch is started.

Switch Events View

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

Administrative Interface

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

- Config Admin tab
- Firmware Upgrade tab
- License Admin tab
- QuickLoop Admin tab
- Reboot Switch tab
- SNMP Admin tab
- Switch Admin tab
- User Admin tab

Telnet Interface

Each switch can have only one active Telnet session at a time. For a list of Telnet commands, see Chapter 4, “Telnet Commands.”

The Telnet Interface requires administrative privileges. Once an administrative login is entered, administrative privileges remain available from that workstation until the session is closed and the Web browser is exited.

Chapter 4

Fabric Manager Telnet Commands

Fabric Manager Telnet commands provide management support for the Fabric Manager application. This section contains information about the following Telnet commands:

- [islTopoCheck](#), page 4-1
- [islTopoShow](#), page 4-2
- [sgroupSet](#), page 4-4
- [sgroupDelete](#), page 4-5
- [sgroupRename](#), page 4-6
- [sgroupShow](#), page 4-7
- [sgroupSupportShow](#), page 4-8
- [sgroupSwReplace](#), page 4-11
- [switchStatusPolicySet](#), page 4-12
- [switchStatusPolicyShow](#), page 4-15
- [snmpMibCapSet](#), page 4-16

islTopoCheck

[Figure 4–1](#) shows the `islTopoCheck` command, which displays the interswitch link (ISL) switch group (sgroup) connections and status for this switch. This command is used to verify that the switch is properly cabled and configured.

Each port specified in the ISL definition, and the corresponding ISL sgroup for each switch member, will be displayed. A switch with properly configured ISL connections will report a status of OK for each of these ports.

Figure 4-1 shows the results of `islTopoCheck` on a misconfigured switch. In a proper configuration, all of the switches would have valid domains and names, and each port status would be OK.

```

es_6:admin> islTopoCheck
ISL data for type: S32_6_1, sgroup: My_group
idx  domain  expected wwn          name
01   01     10:00:00:60:69:20:02:9f jr_1003
02   02     10:00:00:60:69:10:a0:4e es_6
03  -01     00:00:00:00:00:00:00:03 -UNKNOWN-
04  -01     00:00:00:00:00:00:00:04 -UNKNOWN-
05  -01     00:00:00:00:00:00:00:05 -UNKNOWN-
06  -01     00:00:00:00:00:00:00:06 -UNKNOWN-

Domain: 2, wwn: 10:00:00:60:69:10:a0:4e

isl  port  expected switch      port  actual switch  port  status
0   08 ->  jr_1003             : 00  jr_1003        : 00  OK
1   09 ->  jr_1003             : 01  jr_1003        : 01  OK
2   10 ->  jr_1003             : 02  jr_1003        : 03  Wrong port
3   11 ->  jr_1003             : 03  -UNKNOWN-     :-01  Bad status
    
```

Figure 4-1: `islTopoCheck` command example

islTopoShow

Figure 4-2 shows the `islTopoShow` command which displays ISL sgroup topology and status. This command is available to all users. The `islTopoShow` command displays the current connections and status for every switch in all ISL sgroups of which the current switch is a member. The status for every port and switch combination in each active ISL group will be displayed.

This command has the following operand:

- `sgroup`: If the name of a switch group or switch group type is specified in quotes, then the command will show the ISL connection status for the specified sgroup or all sgroups of the specified type. The default behavior, if no input is provided, is to report the topology status for all ISL sgroups of which the current switch is a member.

Figure 4-2 shows the results of `islTopoShow` on a misconfigured switch. In a proper configuration, all of the switches would have valid domains and names, and each port status would be OK.

```

es_6:admin> islTopoShow

ISL data for type: S32_6_1, sgroup: My_group

idx   domain  expected wwn      name
01     01     10:00:00:60:69:20:02:9f  jr_1003
02     02     10:00:00:60:69:10:a0:4e  es_6
03     -01    00:00:00:00:00:00:00:03  -UNKNOWN-
04     -01    00:00:00:00:00:00:00:04  -UNKNOWN-
05     -01    00:00:00:00:00:00:00:05  -UNKNOWN-
06     -01    00:00:00:00:00:00:00:06  -UNKNOWN-

Switch idx: 1 Domain: 1, wwn: 10:00:00:60:69:20:02:9f

isl    port  expected switch    port    actual switch  port  status
0      00 -> es_6              : 08     es_6          : 08  OK
1      01 -> es_6              : 09     es_6          : 09  OK
2      02 -> es_6              : 10     -UNKNOWN-    :-01  No record
3      03 -> es_6              : 11     es_6          : 10  Wrong port
4      04 -> -UNKNOWN-      : 08     -UNKNOWN-    :-01  No record
5      05 -> -UNKNOWN-      : 09     -UNKNOWN-    :-01  No record
6      06 -> -UNKNOWN-      : 10     -UNKNOWN-    :-01  No record
7      07 -> -UNKNOWN-      : 11     es_6          : 13  Wrong switch
8      08 -> -UNKNOWN-      : 08     -UNKNOWN-    -01    No record
9      09 -> -UNKNOWN-      : 09     -UNKNOWN-    -01    No record
10     10 -> -UNKNOWN-      : 10     -UNKNOWN-    :-01  No record
11     11 -> -UNKNOWN-      : 11     -UNKNOWN-    :-01  No record
12     12 -> -UNKNOWN-      : 08     -UNKNOWN-    :-01  No record
13     13 -> -UNKNOWN-      : 09     -UNKNOWN-    :-01  No record
14     14 -> -UNKNOWN-      : 10     -UNKNOWN-    :-01  No record
15     15 -> -UNKNOWN-      : 11     -UNKNOWN-    :-01  No record

Switch idx: 2 Domain: 2, wwn: 10:00:00:60:69:10:a0:4e

isl    port  expected switch    port    actual switch  port  status
0      08 -> jr_1003          : 00     jr_1003       : 00  OK
1      09 -> jr_1003          : 01     jr_1003       : 01  OK
2      10 -> jr_1003          : 02     jr_1003       : 03  Wrong port
3      11 -> jr_1003          : 03     -UNKNOWN-     :-01  No record
4      12 -> -UNKNOWN-      : 12     -UNKNOWN-     :-01  No record
5      13 -> -UNKNOWN-      : 13     jr_1003       : 07  Wrong switch
6      14 -> -UNKNOWN-      : 14     -UNKNOWN-     :-01  No record
7      15 -> -UNKNOWN-      : 15     -UNKNOWN-     :-01  No record

```

Figure 4-2: islTopoShow command example

sgroupSet

Figure 4-3 shows the `sgroupSet` command, which enables you to create a switch group. A switch group is a combination of six switch elements with common parameters, interconnected with ISLs, which acts as a single, high-port count switch. If any parameter is not specified, the session will become an interactive session for which all the parameters will be prompted.

This command has the following operands:

NOTE: When entering the information in an interactive session, do not type quotation marks.

- **sgType:** Specify a character string in quotation marks containing the sgroup type, for example “S32_6_1”. The given type **MUST** be a valid type. If the type is not valid, this command will be rejected. Valid types are displayed when this command is run interactively.
- **sgName:** Specify a character string in quotation marks containing the sgroup name, for example “FirstGroup”. The given name must have from 1 to 32 characters, comprised of letters, digits or underscores. Spaces are not allowed.
- **sgMemberList:** Specify a character string in quotation marks containing the sgroup members, for example “1,2,3,4,5,6”. This list can be either the WWN format or domain ID format. If given in domain ID format, the list will be validated first to ensure that all the specified switch domains are valid. If given in WWN format, a warning message may appear if any WWN given is not in the current fabric.

WWN format:

“aa:bb:cc:dd:ee:ff:xx:yy,aa:bb:cc:dd:ee:ff:xx:zz,
aa:bb:cc:dd:ee:ff:xx:ww,...,aa:bb:cc:dd:ee:ff:xx:qq”

Domain ID format:

“domain_ID1,domain_ID2,...,domain_IDx”

To set a group called “My Group” of type “S32_6_1” using domain IDs 1 through 6, see Figure 4-3.

```
sw:admin> sgroupSet "S32_6_1", "MyGroup", "1,2,3,4,5,6"  
  
Committing configuration...done.
```

Figure 4-3: `sgroupSet` command example

Figure 4-4 shows the interactive form of sgroupSet:

```
sw:admin> sgroupSet
  Here are the valid sgroup types:
    S32_6_1

  Please Enter Group Type: [S32_6_1] S32_6_1
  Please Enter Group Name: [ ] MyGroup
  Enter member list by domain#? (yes, y, no, n): [yes] n
  For Group Member #1
  enter its WWN (in hex): [00:00:00:00:00:00:00] 10:00:00:60:69:00:00:20
  For Group Member #2
  enter its WWN (in hex): [00:00:00:00:00:00:00] 10:00:00:60:69:20:15:81
  For Group Member #3
  enter its WWN (in hex): [00:00:00:00:00:00:00] 10:00:00:60:69:10:02:18
  For Group Member #4
  enter its WWN (in hex): [00:00:00:00:00:00:00] 10:00:00:60:69:20:15:71
  For Group Member #5
  enter its WWN (in hex): [00:00:00:00:00:00:00] 10:00:00:60:69:00:30:05
  For Group Member #6
  enter its WWN (in hex): [00:00:00:00:00:00:00] 10:00:00:60:69:00:60:11
  Committing configuration...done.
```

Figure 4-4: Interactive form of sgroupSet

sgroupDelete

Figure 4-5 shows the sgroupDelete command, which enables you to delete a switch group. If the parameter is not specified, the command will become an interactive session and the necessary parameters will be prompted.

This command makes the same change to all switches in the specified group. It executes on every switch in the group if, and only if, each switch in the group can perform the action.

This command has the following operands:

NOTE: When entering the information in an interactive session, do not type quotation marks.

- **sgName:** Specify a character string in quotation marks containing the switch group name to be deleted (for example “MyGroup”). Entering a wrong name will cause this command to terminate without modifying any switch groups. The sgroup name is case sensitive.
- **force:** Specify the force parameter to delete the group even if one or more members of the group failed to execute the command. The entered string must be “force”.

```
sw:admin> sgroupDelete
Please Enter Group Name: [ ] MyGroup
About to DELETE the group with Group name “MyGroup”
ARE YOU SURE (yes, y, no, n): [no] y
Committing configuration...done.
```

Figure 4-5: sgroupDelete command, interactive example

Figure 4-6 shows an invalid group:

```
sw:admin> sgroupDelete “MyPrevGroup”
Group Name “MyPrevGroup” does not exist.
```

Figure 4-6: sgroupDelete, invalid group

sgroupRename

Figure 4-7 shows the sgroupRename command, which enables you to rename a specified sgroup name to the given new name. The member list for the renamed group is not modified. If any parameter is not specified, the session will become an interactive session for which all the parameters will be prompted.

This command has the following operands:

NOTE: When entering the information in an interactive session, do not type quotation marks.

- **oldName:** Specify a character string in quotation marks containing the sgroup name to be replaced, for example “MyPrevGroupName.”
- **newName:** Specify a character string in quotation marks containing the new sgroup name, for example “MyNewGroupName.”

Figure 4-7 shows a noninteractive session using `sgroupRename`:

```
sw:admin> sgroupShow
Group Type          Group Name          Member WWN
=====
S32_6_1             MyPrevGroupName    10:00:00:60:69:00:00:20
                   10:00:00:60:69:20:15:81
                   10:00:00:60:69:10:02:18
                   10:00:00:60:69:20:15:71
                   10:00:00:60:69:00:30:05
                   10:00:00:60:69:00:60:11

sw:admin> sgroupRename "MyPrevGroupName", "MyNewGroupName"
Committing configuration...done.
sw:admin> sgroupShow
Group Type          Group Name          Member WWN
=====
S32_6_1             MyNewGroupName     10:00:00:60:69:00:00:20
                   10:00:00:60:69:20:15:81
                   10:00:00:60:69:10:02:18
                   10:00:00:60:69:20:15:71
                   10:00:00:60:69:00:30:05
                   10:00:00:60:69:00:60:11
```

Figure 4-7: `sgroupRename` command example

sgroupShow

Figure 4-8 shows the `sgroupShow` command, which enables you to display switch group configuration information. If no parameter is specified, all `sgroup` definitions will be displayed. If a parameter is specified, all `sgroups` with `sgType` or `sgName` that contain the given parameter string will be displayed.

The **sgroupShow** command's operands are listed next.

NOTE: When entering the information in an interactive session, do not type quotation marks.

- `sgType`: Specify a character string in quotation marks containing the `sgroup` type to be displayed, for example "S32_6_1". This operand must be enclosed in quotation marks.

- **SgName:** Specify a character string in quotation marks containing the sgroup name to be displayed, for example “Group.” If no parameter is specified, all defined sgroups will be displayed. This operand must be enclosed in quotation marks.

Figure 4-8 displays all switch group configurations:

sw:admin> sgroupShow		
Group Type	Group Name	Member WWN
=====		
S32_6_1	MyNewGroupName	10:00:00:60:69:00:00:20
		10:00:00:60:69:10:62:ee
		10:00:00:60:69:10:61:0e
		10:00:00:60:69:10:60:f9
		10:00:00:60:69:10:62:44
		10:00:00:60:69:10:60:a0

sw:admin> sgroupShow "Group"		
Group Type	Group Name	Member WWN
=====		
S32_6_1	MyNewGroupName	10:00:00:60:69:00:00:20
		10:00:00:60:69:20:15:81
		10:00:00:60:69:10:02:18
		10:00:00:60:69:20:15:71
		10:00:00:60:69:00:30:05
		10:00:00:60:69:00:60:11

Figure 4-8: sgroupShow command example

sgroupSupportShow

Figure 4-9 shows the sgroupSupportShow command, which displays switch information for all switches within the specified group. This command can display a range of debugging information for all the switches in a switch group. If no **commandName** is specified or **all** is specified in place of a command name, all the supported commands are displayed for the all the switches within a switch group. If a single command is specified, only the information for that command is displayed.

sgroupSupportShow operands are listed next.

NOTE: When entering the information in an interactive session, do not type quotation marks.

- **sgroupName:** Specify the name of the switch group. This operand must be enclosed in quotation marks. This operand is required.
- **commandName:** Specify the name of the command to be displayed for the specified switch group. If no command is specified, or **all** is specified, all the supported commands are executed against all the switches within a switch group. Below is a list of command names that are supported in the order they are executed. These command names are not case-sensitive. Enclose operands in quotation marks.
 - version**
 - uptime**
 - tempShow**
 - psShow**
 - licenseShow**
 - diagShow**
 - errDump**
 - switchShow**
 - portFlagsShow**
 - portErrShow**
 - mqShow**
 - portSemShow**
 - portShow**
 - portRegShow**
 - portRouteShow**
 - fabricShow**
 - topologyShow**
 - qlShow**
 - nsShow**
 - nsAllShow**
 - cfgShow**
 - configShow**
 - faultShow**
 - traceShow**
 - portLogDump**

4-10 Fabric Manager for the Fibre Channel SAN Switch Integrated/32 and Integrated/64, Version 1.0

Figure 4-9 shows how to display the temperature in all the switch elements of a SAN Integrated Switch.

```
sw5:admin>sgroupsupportshow "starbase", "tempshow"
Group Type      Group Name      Member WWN
=====
S32_6_1         starbase        10:00:00:60:69:10:57:91
                  10:00:00:60:69:10:56:79
                  10:00:00:60:69:10:58:89
                  10:00:00:60:69:10:57:dd
                  10:00:00:60:69:10:58:63
                  10:00:00:60:69:10:58:3f

Please wait for remote data!
value = 0
star7:root>

=====
Information from Local Domain 7
=====
27  30  31  33  32  Centigrade
80  86  87  91  89  Fahrenheit
=====
Information from Domain 8
=====
28  29  32  33  33  Centigrade
82  84  89  91  91  Fahrenheit
=====
Information from Domain 9
=====
27  29  33  34  32  Centigrade
80  84  91  93  89  Fahrenheit
=====
Information from Domain 10
=====
26  30  31  34  31  Centigrade
78  86  87  93  87  Fahrenheit
=====
Information from Domain 11
=====
28  29  31  33  32  Centigrade
82  84  87  91  89  Fahrenheit
=====
Information from Domain 12
=====
28  31  34  35  33  Centigrade
82  87  93  95  91  Fahrenheit
=====
=====DONE=====
```

Figure 4-9: sgroupSupportShow command example

sgroupSwReplace

Figure 4-10 shows the `sgroupSwReplace` command, which enables you to replace a member of a switch group. The order of members within the member list will not be changed by this operation. If any parameter is not specified, the session will become an interactive session and all the parameters will be prompted.

This command makes the same change to all switches in the group. It will execute on every switch in the group, as long as each switch in the group can perform the action.

sgroupSwReplace operands are listed next. All operands are optional.

NOTE: When entering the information in an interactive session, do not type quotation marks.

- **sgName:** Specify the switch group name (for example, “NewGroup”) that contains the member you want to replace. The switch group name must be enclosed in quotation marks.
- **oldWwn:** Specify the WWN of a switch group member (for example, “10:00:00:60:69:20:22:22”) that you want to replace. The WWN must be enclosed in quotation marks.
- **newWwn:** Specify the WWN of the new member (for example, “10:00:00:60:69:20:55:55”). The WWN must be enclosed in quotation marks.

Figure 4-10 shows the non-interactive form of `sgroupSwReplace`. The `sgroupShow` command is used to illustrate the changes made with the `sgroupSwReplace` command.

```

sw:admin> sgroupShow
Group Type                Group Name                Member WWN
=====
S32_6_1                   NewGroup                  10:00:00:60:69:20:15:71
                           10:00:00:60:69:20:15:93
                           10:00:00:60:69:20:15:2a
                           10:00:00:60:69:20:18:32
                           10:00:00:60:69:20:22:22
                           10:00:00:60:69:20:64:31

value = 0
sw:admin> sgroupSwReplace "NewGroup", "10:00:00:60:69:20:22:22", "10:00:00:60:69:20:55:55"
Committing configuration...done.
sw:admin> sgroupShow
Group Type                Group Name                Member WWN
=====
S32_6_1                   NewGroup                  10:00:00:60:69:20:15:71
                           10:00:00:60:69:20:15:93
                           10:00:00:60:69:20:15:2a
                           10:00:00:60:69:20:18:32
                           10:00:00:60:69:20:55:55
                           10:00:00:60:69:20:64:31
    
```

Figure 4-10: sgroupShow, sgroupSwReplace command examples

switchStatusPolicySet

Figure 4-11 shows the switchStatusPolicySet command, which enables you to set the policy parameters that determine the overall switch status. Use this command to set the policy parameters for calculating the overall status of the switch enclosure. The policy parameter values determine how many failed or faulty units of each contributor are allowed before triggering a status change in the switch from HEALTHY to MARGINAL or DOWN.

The command will print the current parameters in a three column table format. The first column specifies the contributor; the second column specifies the minimum number that contributes to the DOWN/FAILED status; the third column specifies the minimum

number that contributes to the MARGINAL/WARNING status. This command then prompts the user to change the values for each policy parameter. The default values for the policy parameters are as follows:

Table 4-1: Default Values for switchStatusPolicySet Parameters

Contributor	Default Value for DOWN	Default Value for MARGINAL
FaultyPorts	2	1
MissingGBICs	0	0
PowerSupplies	2	1
Temperatures	2	1
Fans	2	1
PortStatus	0	0
sgroup ISLStatus	2	1

Any single contributor can force the overall status of the switch to MARGINAL or DOWN.

This command enables you to set a threshold for each contributor, so that a certain number of failures are allowed before changing the status of the switch.

If the value of a policy parameter is set to 0, it means that this factor is not used to determine the status of the switch. If the range of values for a particular contributor are set to 0 for both MARGINAL and DOWN, that contributor is not used in the calculation of the overall switch status.

ISLStatus monitors ISLs that are part of a defined switch group. The status of other ISLs on the same switch but outside of the group definition will not be considered when calculating switch status. If no switch groups are defined on this switch, then these ISLStatus settings will have no effect on switch status.

The sgroup ISLStatus does not affect the status of the switch as quickly as the other contributors. It may take a few minutes for a switch group ISL status change to affect the state of the switch.

NOTE: When PortStatus monitoring is set to values of (0,0), port status changes are not logged to the event log and console. Similarly, GBIC removal does not generate a message to the event log and console if MissingGBICs is set to (0,0). By configuring these options, the user can more closely monitor for port status and removal of GBICs.

Notice that in [Figure 4-11](#), the only parameters modified are the number of FaultyPorts allowed before the status of the switch changes to MARGINAL and DOWN.

```

switch:admin> switchStatusPolicySet
  To change the overall switch status policy parameters
  The current overall switch status policy parameters:
  Down   Marginal
  -----
  FaultyPorts      1   0
  MissingGBICs     0   1
  PowerSupplies    2   1
  Temperatures     2   1
  Fans              2   1
  PortStatus        0   0
  sgroup ISLStatus 2   1

Note that the value, 0, for a parameter, means that it is NOT used in the calculation.
** In addition, if the range of settable values in the prompt is (0..0),
** the policy parameter is NOT applicable to the switch.
** Simply hit the Return key.

The minimum number of
FaultyPorts contributing to DOWN status: (0..8) [2]
FaultyPorts contributing to MARGINAL status: (0..8) [1]
MissingGBICs contributing to DOWN status: (0..8) [0]
MissingGBICs contributing to MARGINAL status: (0..8) [0] 1
Bad PowerSupplies contributing to DOWN status: (0..2) [2]
Bad PowerSupplies contributing to MARGINAL status: (0..2) [1]
Bad Temperatures contributing to DOWN status: (0..5) [2]
Bad Temperatures contributing to MARGINAL status: (0..5) [1]
Bad Fans contributing to DOWN status: (0..6) [2]
Bad Fans contributing to MARGINAL status: (0..6) [1]
Down PortStatus contributing to DOWN status: (0..8) [0]
Down PortStatus contributing to MARGINAL status: (0..8) [0]
Down ISLStatus contributing to DOWN status: (0..16) [2]
Down ISLStatus contributing to MARGINAL status: (0..16) [1]

Policy parameter set has been changed
... Committing configuration...done.

```

Figure 4-11: switchStatusPolicySet

switchStatusPolicyShow

Figure 4-12 shows the `switchStatusPolicyShow` command, which displays the policy parameters that determine the overall switch status. Use this command to view the current policy parameters set for the switch. These policy parameters determine the number of failed or nonoperational units allowed for each contributor before triggering a status change in the switch.

The command will print the current parameters in a three column table format. The first column specifies the contributor; the second column specifies the minimum number that contributes to the DOWN/FAILED status; the third column specifies the minimum number that contributes to the MARGINAL/WARNING status. Table 4-2 lists default values for the policy parameters.

Table 4-2: Default Values for switchStatusPolicyShow Parameters

Contributor	Default Value for DOWN	Default Value for MARGINAL
FaultyPorts	2	1
MissingGBICs	0	0
PowerSupplies	2	1
Temperatures	2	1
Fans	2	1
PortStatus	0	0
sgroup ISLStatus	2	1

The policy parameters determine the number of non-operational units for each contributor that trigger a status change in the switch. For example, if the FaultyPorts DOWN parameter is set to 3, and 3 ports fail in the switch, then the status of the switch changes to DOWN.

```

switch:admin> switchStatusPolicyShow
The current overall switch status policy parameters:
      Down  Marginal
-----
FaultyPorts  1    0
MissingGBICs 0    1
PowerSupplies 2    1
Temperatures 3    1
Fans         3    1
PortStatus   0    0
sgroup ISLStatus 2    1

```

Figure 4-12: switchStatusPolicyShow command example

snmpMibCapSet

Figure 4-13 shows the `snmpMibCapSet` command, which enables you to view and modify options for configuring SNMP MIB/Trap Capability. This command enables a user to turn on or off certain MIBS and TRAPS. This command also enables a user to turn on or off group information and SSN in SW trap messages. It first displays current settings and then prompts the user to change the values for each parameter.

- FA-MIB—Specifying yes means the user can access FA MIB variables with an SNMP manager. The default value is yes.
- SW-TRAP—Specifying yes means the SNMP management application can receive SW traps from the switch. The default value is yes.
- FA-TRAP—Specifying yes means the SNMP management application can receive FA traps from the switch. The default value is yes.
- SW-EXTTRAP—Specifying yes means the user can receive group information such as Group Name, Group Type, and Member Position, and SSN in the SW traps. The default value is no.

```
swd55:admin> snmpmibcapset
The SNMP Mib/Trap Capability has been set to support
FE-MIB SW-MIB FA-MIB SW-TRAP FA-TRAP
FA-MIB (yes, y, no, n): [yes]
SW-TRAP (yes, y, no, n): [yes]
FA-TRAP (yes, y, no, n): [yes]
SW-EXTTRAP (yes, y, no, n): [no]
no change
```

Figure 4-13: `snmpMibCapSet`

Glossary

This glossary defines terms used in this guide or found in the Fabric Manager application, and is not a comprehensive glossary of computer terms.

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 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 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.

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.

Bandwidth

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

BB_Credit

Buffer-to-buffer credit. The number of frames that can be transmitted to a directly connected recipient or within an arbitrated loop. Determined by number of available receive buffers. *See also* [Buffer-to-Buffer Flow Control](#), [EE_Credit](#).

BER

Bit Error Rate. Rate at which bits are expected to be received in error. Expressed as ratio of error bits to total bits transmitted. *See also* [Error](#).

Bit Synchronization

The delivery of correctly clocked bits at the required BER. *See also* [BER](#).

Broadcast

Transmission of data from a single source to all devices in fabric, regardless of zoning. *See also* [Multicast](#), [Unicast](#).

Buffer-to-Buffer Flow Control

Management of frame transmission rate between directly connected ports or within an arbitrated loop. *See also* [BB_Credit](#).

Cascade

Two or more interconnected Fibre Channel 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.

Class 3

A connectionless frame switching service between two ports, without notification of delivery or non-delivery. Can also be used to provide a multicast connection between originator and recipients, with notification of delivery or non-delivery.

Class F

A 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.

Community (SNMP)

Relationship between a group of SNMP managers and an SNMP agent, in which authentication, access control, and proxy characteristics are defined.

CRC

Cyclic Redundancy Check. A check for transmission errors; included in every data frame.

Credit

As applies to Fibre Channel, the number of receive buffers available for transmission of frames between ports. *See also* [BB_Credit](#) and [EE_Credit](#).

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.

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

A unique number between 1 and 239 that identifies the switch to the fabric.

E_D_TOV

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

E_Port

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

EE_Credit

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

Enabled configuration

The currently enabled zone configuration. Only one configuration can be enabled at a time. *See also* [Defined configuration](#), [Zone configuration](#).

End-to-end flow control

Governs flow of Class 1 and 2 frames between N_Ports. *See also* [Buffer-to-Buffer Flow Control](#), [EE_Credit](#).

Error

As applies to Fibre Channel, a missing or corrupted frame, time-out, loss of synchronization, or loss of signal. *See also* [BER](#), [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](#).

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

Operating system on Compaq Fibre Channel SAN 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.

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](#).

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 present, to exchange service parameters with the fabric. *See also* [PLOGI](#).

Frame

Fibre Channel structure used to transmit data. Consists of start-of-frame delimiter, header, any optional headers, data payload, cyclic redundancy check (CRC), and end-of-frame delimiter. There are two types: data frames and link control frames. Similar to the networking concept “packet”. *See also* [Sequence](#), [Data word](#).

FRU

Field Replaceable Unit. A component that can be replaced on site.

FS

Fibre Channel Service. A service that is defined by Fibre Channel standards and exists at a well-known address. For example, Name Server is a Fibre Channel service. *See also* [FSP](#).

FSP

Fibre Channel Service Protocol. The common protocol used for all fabric services, transparent to fabric type or topology. *See also* [FS](#).

FSPF

Fabric Shortest Path First. 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.

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 synchronization.

Initiator

Server or workstation that initiates communications with storage devices over a Fibre Channel network. *See also* [Target](#).

IOD

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

ISL

Interswitch Link. Fibre Channel link from the E_Port of one switch to E_Port of another.

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.

L_Port

Loop Port. Node or fabric port that can use loop protocol or fabric protocol. *See also* [Non-participating mode](#), [Participating mode](#).

Latency

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

Link

As applies to Fibre Channel, a physical connection between two ports, consisting of both transmit and receive fibers. *See also* [Circuit](#).

Link services

Protocol for link-related actions.

LIP

Loop Initialization Primitive. The signal used to begin initialization in a loop. Indicates either loop failure or resetting of a node. *See also* [Loop initialization](#).

Loop failure

Loss of signal within a loop for any period of time, or loss of synchronization for longer than the time-out value. *See also* [E_Port](#).

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 fiber 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.

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](#).

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.

NL_Port

Node Loop Port. An N_Port that can use loop protocol. *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.

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](#).

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](#).

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.

Public loop

An arbitrated loop attached to a switch.

QuickLoop

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.

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](#), [E_Port](#).

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 Services

Product that enables two Compaq Fibre Channel SAN 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.

Route

As applies to fabric, a communication path between two switches. *See also* [FSPF](#).

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](#).

Single mode

Fibre-optic cabling standard for distances of up to 10 kilometers between devices.

SNMP

Simple Network Management Protocol. Internet management protocol that does not rely on underlying communication protocols and can therefore be made available over other protocols, such as UDP/IP. *See also* [Community \(SNMP\)](#).

SNS

Simple Name Server. *See* [Name server](#).

Switch

A combination of hardware and firmware that routes frames according to Fibre Channel protocol. Switches can have G_Ports, E_Ports, F_Ports, and FL_Ports.

Switch Domain_ID

Unique identifier for a switch, used in routing frames. Usually automatically assigned by the switch, but can be manually assigned by administrator.

Switch name

Arbitrary name assigned to switch by administrator. *See also* [Switch Domain_ID](#).

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](#).

Topology

As applies to Fibre Channel, the structure of the Fibre Channel network and the resulting possible communication paths. There are three Fibre Channel topologies: point-to-point, fabric, and arbitrated loop.

Translative mode

Mode in which public devices can communicate with private devices across fabric.

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.

ULP

Upper Layer Protocol. Protocol that runs on top of Fibre Channel. Typical upper layer protocols: SCSI, IP, HIPPI, IPI.

Unicast

Transmission of data from a single source to single destination. *See also* [Broadcast](#), [Multicast](#).

Web Management 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

Worldwide Name. Identifier that is unique worldwide. Each entity in a fabric has a separate WWN.

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. *See also* [Zoning](#).

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](#).

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