user guide

hp StorageWorks fabric manager version 3.0.x

Product Version: V3.0.x/V4.0.x

Second Edition (February 2003)

Part Number: AA–RTSKB–TE

This user guide describes how to install, configure, and use *HP StorageWorks* Fabric Manager to monitor and manage fabrics and individual switches running firmware version 3.0.x or 4.0.x.

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Fabric Manager Version 3.0.x User Guide
Second Edition (February 2003)
Part Number: AA–RTSKB–TE

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about this guide

This user guide provides information to help you:

- Install and configure Fabric Manager
- Use Fabric Manager to manage your fabric and switches
- Contact technical support for additional assistance

“About this Guide” topics include:

- Overview, page 12
- Conventions, page 13
- Rack Stability, page 16
- Getting Help, page 17

Overview

This section covers the following topics:

- Intended Audience
- Related Documentation

Intended Audience

This book is intended for use by system administrators who are experienced with the following:

- *HP StorageWorks* Fibre Channel SAN switches
- Fabric Operating System (FOS) V3.0.x or later

Related Documentation

For a list of related documents included with this product, see the Related Documents section of the Release Notes that came with your switch.

For the latest information, documentation, and firmware releases, please visit the following StorageWorks website:

http://www.compaq.com/storage/productindexdisk.html

For information about Fibre Channel standards, visit the Fibre Channel Association website, located at http://www.fibrechannel.com.

Conventions

Conventions consist of the following:

- Document Conventions
- Text Symbols
- Equipment Symbols

Document Conventions

The document conventions included in Table 1 apply in most cases.

Table 1: Document Conventions

Element	Convention
Cross-reference links	Blue text: Figure 1
Key and field names, menu items, buttons, and dialog box titles	**Bold**
File names, application names, and text emphasis	*Italics*
User input, command and directory names, and system responses (output and messages)	`Monospace font` `COMMAND NAMES` are uppercase monospace font unless they are case sensitive
Variables	`<monospace, italic font>`
Website addresses	Blue, underlined sans serif font text: http://www.hp.com

Text Symbols

The following 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 death.

Caution: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

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

Equipment Symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings.

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of personal safety from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of personal safety from a hot component, allow the surface to cool before touching.

Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of personal safety from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal safety or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Rack Stability

Rack stability protects personnel and equipment.

WARNING: To reduce the risk of personal safety or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- In single rack installations, the stabilizing feet are attached to the rack.
- In multiple rack installations, the racks are coupled.
- Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.

Getting Help

If you still have a question after reading this guide, contact an HP authorized service provider or access our website: http://www.hp.com.

HP Technical Support

In North America, call technical support at 1-800-652-6672, available 24 hours a day, 7 days a week.

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

Outside North Americas, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website under support: http://thenew.hp.com/country/us/eng/support.html.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP Storage Website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at: http://www.hp.com/country/us/eng/prodserv/storage.html. From this website, select the appropriate product or solution.

HP Authorized Reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP website for locations and telephone numbers: http://www.hp.com.

Introducing Fabric Manager

This chapter provides the following information:

- Overview on page 20
- Features on page 22
- Fabric OS Integration on page 26
- Concepts on page 27

Overview

Fabric Manager provides a graphical interface that allows the administrator to monitor and manage an entire fabric from a standard workstation. Fabric Manager can be used to manage fabrics containing integrated fabrics, in addition to individual switches.

Fabric Manager provides high-level information about all switches in the fabric, launching the Web Tools application when more detailed information is required. The launching of Web Tools is transparent, providing a seamless user interface. In addition to the ability to view the switches as a group, Fabric Manager provides improved efficiencies in the management of SANs over Web Tools alone.

Fabric Manager is installed on the workstation, and can be used to manage any switches that have Fabric OS V2.2 or later and Web Tools V2.2 or later installed.

Advantages

Fabric Manager is the complete SAN management power tool for SANs, and provides the following advantages to administrators:

- Provides a highly scalable Java-based application that manages multiple switches and multiple fabrics (up to 8) in real-time.
- Assists SAN administrators with the configuration, monitoring, dynamic provisioning and daily management of Storage Area Networks.
- Lowers the cost of SAN ownership by intuitively facilitating SAN management tasks.
- Saves time by enabling the global integration and execution of processes across multiple fabrics, through its single-point SAN management platform.
- Allows more effective management by providing rapid access to critical SAN information across both Fabric OS SANs and enhanced Fabric OS SANs.

Capabilities

In cooperation with Web Tools, Fabric Manager provides the following information and capabilities:

- Configure and manage the fabric on multiple efficient levels.
- Intelligently group multiple SAN objects and SAN management functions to provide ease and time-efficiency in administering tasks.

- Identify, isolate, and manage SAN events across multiple switches and fabrics.
- Provide drill-down capability to individual SAN components through tightly coupled Web Tools and Fabric Watch integration.
- Discover all SAN components and view the real-time state of all fabrics.
- Execute multi-fabric administration of Secure Fabric OS SANs through a single encrypted console.
- Implement scalable SAN management tasks through functionality and tools that intelligently span 8 fabrics and 200 switches.
- Monitor Interswitch Links (ISLs).
- Manage switch licenses.
- Perform fabric stamping.

Features

This section describes Fabric Manager's core and advanced management features.

Core Features

Fabric Manager delivers enhanced levels of efficiency to administrators that are immersed in multiple HP SANs. It has the unique ability to provide real-time information and facilitate rapid SAN management.

Improved Scalability

Fabric Manager is highly scalable and can manage up to eight fabrics and 200 switches in real-time.

A Single Console Global SAN Management Platform

Fabric Manager has the intelligence to manage multiple SAN objects spanning up to 8 fabrics. It dynamically collects (in real time) all SAN fabric elements and portrays them within the single console, allowing intuitive iconic and explorer tree operations.

For more information, see "Accessing Fabric Manager View" on page 42.

Enhanced SAN Visibility

Fabric Manager can globally capture and present reliable statuses across all SAN objects. These are projected throughout the entire SAN management environment. This context-sensitive feature allows the status of all SAN components to be dynamically discovered and controlled by Fabric Manager.

For more information, see "Events" on page 86 or "Fabric Manager Log" on page 74.

Intuitive and Functional Object Management Platform

Fabric Manager's visual display is tailored to facilitate a high degree of efficiency when working with multiple storage area networks (SANs), medium to large SANs and up to 200 fabric switches. Fabric Manager provides object status of critical fabric elements such as fabric events, capturing this information in real-time across multiple fabrics.

For more information, see "Events" on page 86.

Advanced Management Features

Fabric Manager provides unique and intuitive advanced methods for managing storage area networks (SANs).

User-Controllable SAN Object Grouping

Fabric Manager enables the SAN manager with the power to group fabric switches in any logical user-defined group. These groups are dynamically and intelligently propagated throughout Fabric Manager. User-defined groups can be utilized at any time and ultimately lower the cost of SAN management.

For more information, see "Logical Groups" on page 27.

ISL Monitoring

Fabric Manager enables you to monitor the physical connections (known as Interswitch Links, or ISLs) between switches and ports. Specific alarm settings may be chosen, and changes in the ISL topology, such as moves and disconnects can be monitored in the Events dialog box as well as by the status color of the switch icon.

For more information, see "ISL Status Tab" on page 68 and "Setting ISL Status Parameters" on page 69.

Fully Controllable Sequenced and Timed Reboot

For SAN administrators immersed in the complexities of hardware and firmware management, Fabric Manager provides a totally flexible environment for controlling the availability of fabric switches. The ability to control switch availability is tightly controlled using logical groupings and global password control.

For more information, see "Reboot" on page 102.

Global Password Control

Fabric Manager provides the advanced ability to manage a user-definable set of fabric switch passwords. Secure and encrypted objects can be utilized across all secure features within the platform and across logical groups.

For more information, see "Telnet" on page 90.

Highly Flexible Firmware Download

The Firmware Download feature is dynamically configurable and scalable across logical groups, password controls, and multiple fabrics. When utilized with the Sequenced Reboot functionality, it provides a fully configurable environment to SAN administrators for controlling the Fabric OS firmware download process.

For more information, see "Download Firmware" on page 99.

Advanced License Key Management

Fabric Manager provides a powerful environment to manage license keys across all SAN fabrics under its control. Fabric Manager can receive licenses from support (via e-mail), enabling you to perform pre and post installation cross-checking of License keys. License management is fully integrated to all advanced features, particularly Groups and Password Control.

For more information, see "Licensing" on page 106.

Configuration Control through Intelligent Baseline Profiling

This function allows SAN managers to capture a detailed, customizable profile of a switch within any fabric. Once the snapshot has been acquired, it can optionally be stored in any user-definable location, external Configuration Control Database, or Management Framework. At any point in time, a static profile can be reviewed and analyzed against an active fabric or switch within a SAN.

For more information, see "Comparing or Downloading a Switch Configuration from a File" on page 105.

Enhanced Merge Control

Storage Area Network Administrators can easily control the merging details of SAN management through the Fabric Manager multi-fabric platform. When merging fabrics and zones within fabrics, Fabric Manager does most of the work for the administrator. Fabric Manager delivers a detailed transaction report of the proposed zone merge operation that identifies any inconsistencies or underlying issues that may exist within the topology or operation.

For more information, see "Fabric Merge" on page 108.

Tight Integration of Management Products

Fabric Manager is tightly integrated with HP's entire SAN management family of products. It has the native ability to work with:

- Web Tools for a rapid drill-down to individual SAN elements within a fabric.
- Fabric Watch for advanced fabric wide status reporting, threshold gathering and information analysis. Provides rapid access to Fabric Watch allows reporting of conditions across multiple fabrics.

Fabric Manager's ability to work easily with all Management tools is unique and highly functional, effectively reducing the time and costs of managing your SAN.

Fabric OS Integration

The Fabric OS version running on the switch determines what functionality is supported by Fabric Manager. A matrix that outlines the features and what version of the Fabric OS they are supported on is shown in Table 2.

The cell contents indicate the access method being used by Fabric Manager to implement the features:

Note: Cells in Table 1–1 that are shaded indicate that the feature is supported.

Table 2: Outline of Feature Support in Fabric OS Versions

Feature	V2.2 - 2.5	V2.6
Firmware Download		
Sequenced Reboot		
Fabric Merge		
License Management		
Configuration Handling		
Multi-fabric Support		
Logical Groups		
ISL Monitoring		
Switch Status Detail (Starts V2.5)		
Set Time	FA 2.0	FA 2.0

Concepts

Logical Groups

A “logical” group can be created to monitor the status of their component switches and propagate actions over the chosen group of switches. A SAN administrator can also use this feature to quickly determine the status of a large number of switches without looking through each one. A logical group differs from a physical group in that they do not necessarily represent a physically grouped set of switches.

For information on creating a logical group, see “Groups” on page 64.

Local Files

Fabric Manager persists groups and other information to “local” files. Fabric Manager stores these files in your home directory. Log files are under your home/Fabric Manager/log.

Import/Export

Logical groups and other configuration information can be saved to local files and shared between hosts through the Import and Export options. Additionally, configuration information can be imported from files.

For more information about Import/Export, see “Groups” on page 64 or “Config” on page 105.

ISL Checking

ISL checking is done by stamping or taking a “snapshot” of a topology. When you turn on ISL checking for a fabric, a stamp is taken of the topology of the ISLs. Then when a change occurs in these ISLs, the status of the switch changes and the detailed information is shown on the Events page, as well as causing the status color of the switch to change during an event.

For information about setting up ISL checking, see “ISL” on page 93 and “Monitor ISLs” on page 149.

Installing Fabric Manager

2

This chapter provides the following information:

- Requirements on page 30
- Installing Fabric Manager on page 31
- Launching Fabric Manager through Windows on page 38
- Adding the Browser Pathname to the Properties File on page 39
- Uninstalling Fabric Manager on page 40

Requirements

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

Switch Requirements

Fabric Manager can be used to manage HP StorageWorks switches that meet the following requirement:

- Fabric OS V2.2 or greater is installed. Fabric Manager can be used to manage switches with earlier versions of Fabric OS, but status and event information is not available.

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 of 21 switches or less
  - 256 MB for fabrics containing more than 21 switches
- 30 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 specifically configured to work with Fabric Manager. For information about how to do this, see "Configuring the Web Browser" on page 2–32.

- Java Plug-in Version 1.2.2-005 or better

Installing Fabric Manager

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

- Installation of one of the supported web browsers on the workstation, if not already installed.
- Configuration of the web browser for use with Fabric Manager.
- Installation of the required Java Plug-in on the workstation, if not already installed.
- Installation of Fabric Manager on the computer to be used as a workstation.
- Exit and re-launch the browser.

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. Note that the Java Plug-in is also required for the correct operation of Fabric Manager and Web Tools. Windows 2000 and NT workstations require Java Plug-in Version 1.2.2-005 or later. The SAN Appliance requires Java Plug-in Version 1.3.1 or later.

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

1. Choose **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 V2.2 or later, and press **Enter**.

   The switch launches the Java Plug-in console, which displays the Java Plug-in version currently installed.
3. Determine whether the correct Java Plug-in version is installed, and install if necessary:
   - If the correct version is installed, Fabric Manager is ready for use.
   - If no Java Plug-in is installed, point the browser toward a switch running Fabric OS V2.2 or later, follow the link to the Sun Microsystems website, and download the correct Java Plug-in, then double-click the downloaded file to install the plug-in.
   - If an outdated version is currently installed, uninstall it, re-launch the browser, enter the address of a switch running Fabric OS V2.2 or later, follow the link to the Sun website, and download the new Java Plug-in.

Installing a Web Browser

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

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

Configuring the Web Browser

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

Configuring Netscape Communicator

The web browser cache must be cleared after the installation of Fabric OS. 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 Netscape Communicator:

1. Choose **Edit > Preferences**.
2. Click **Advanced** in the left text box to expand it, then click **Cache**.
3. Click **Clear Memory Cache**.
4. Click **Clear Disk Cache**.
5. Click **OK**.

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.

The browser cache must be cleared after the installation of Fabric OS. 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. Choose **Internet Options** from the **View** menu if using Internet Explorer 4.x, or from the **Tools** menu if using 5.x.
2. Choose the **General** tab.

3. Click **Delete Files...** (under **Temporary Internet Files**).
4. Click **OK**.
5. Exit and re-launch 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. Choose **Internet Options** from the **View** menu if using Internet Explorer 4.x, or from the **Tools** menu if using 5.x.
2. Choose the **General** tab and click **Settings** (under **Temporary Internet Files**).
3. Under **Check for newer versions of stored pages**, choose **Every visit to the page**.

The correct Browser Process Model must be selected.

To choose the Browser Process Model (only required for Windows NT):

1. Choose **View > Internet Options** if using Internet Explorer 4.x, or **Tools > Internet Options** if using Internet Explorer 5.x.
2. Choose the **Advanced** tab and click to expand the Browsing category.
3. Under **Browsing**, choose **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 Fabric Manager on the Windows Workstation

The Fabric Manager 3.0 installation package includes the following items:

- *ReadMe.txt* file, providing product name, version, and late-breaking news.
- Java Plug-in.
- *FabricManager.Jar* file, containing the required Java classes.
- *FabricManager.properties* file, containing configuration information.

To install Fabric Manager 3.0:

1. Insert the Fabric Manager CD-ROM in the CD drive of the computer workstation.

   If Fabric Manager is already installed on the computer, a dialog box displays. If this dialog box displays, you must exit the installer and uninstall the existing version.

The installer searches the local system for the correct version of the Java Plug-in. If this version is not installed, a dialog box displays warning that the correct version of the plug-in is missing. If the installer warns that the plug-in is missing, perform step 3 before continuing. Otherwise, continue with step 4.

The **Welcome** dialog box displays, providing product information and version.

2. Click **Next**.
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 choose **Explore**.
   c. Click to open the JRE folder, then click on the file *jre-1_3_1-win.exe*. The plug-in installer launches.
   d. Read the license agreement, and click **Next** if you accept the agreement. A dialog box displays to allow selection of the installation location.
   e. Click **Next** to accept the default installation location, or browse for a custom location and then click **Next**. The installation completes and the **Plug-in Installer** dialog box closes.
   f. Re-launch the Fabric Manager installer by double-clicking the icon for your CD-ROM drive. The **Welcome** dialog box displays.
   g. Click **Next** to close the **Welcome** dialog box.

   Once the Java plug-in has been successfully located, a dialog box listing Fabric Manager's web browser requirements displays.
4. Determine whether a compatible browser is installed. If a compatible browser is not installed, exit the Fabric Manager installation, install the browser, and then re-launch the Fabric Manager installation.

Note: The browser should be installed before Fabric Manager is installed so that the pathname for the browser can be written to the Fabric Manager properties file.

---

5. Click **Next** to continue. A dialog box that allows selection of the installation location displays.

6. Click **Install** to accept the default installation location, or browse for a custom location and then click **Install**. A dialog box showing the progress of the installation displays, with the name of the file currently being installed in the lower portion of the dialog box.

   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 dialog box displays warning that no browser was found. If this dialog box displays, exit the Fabric Manager installation, install the browser, and then re-launch the Fabric Manager installation.

Note: If the browser is installed or moved after Fabric Manager is installed, see "Adding the Browser Pathname to the Properties File" on page 2–39.

---

7. Choose 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.txt* file from being displayed.

Configuring a Browser for Secure Telnet

Once you have Secure Telnet software installed, you can configure a browser to use Secure Telnet.

Netscape Navigator 3.0

1. Choose **Options > General Preferences**.
2. Click **Applications** or **Apps** tab. Look for the space for entering a Telnet application.
3. Click **Browse** to choose your Telnet application, or enter the full path and file name of the Telnet application on your computer.

Netscape Communicator (Navigator 4.03 and above)

1. Choose **Edit > Preferences**.
2. Click **Navigator: Applications**. Scroll down the list at the right.
3. Click **URL: Telnet Protocol**, then click **Edit**.

In the **Handled by:** area, make sure **Application** is selected.

4. Click **Browse** to choose your Telnet application, or enter the full path and file name of the Telnet application on your computer.
5. After the full path and file name has been added, place the cursor at the end of the path and type a space and `%1`. Example:

```
C:\Program Files\CRT\Crt.exe %1
```

Microsoft Internet Explorer 3.0

Note: When you first install Internet Explorer, it should already be able to open a Telnet application (called *RUNDLL.32*). Follow these instructions if you wish to change the default Telnet application, or if a default Telnet application is not set.

---

1. Choose **View > Options**. The **Options** dialog box displays.
2. Click **Programs** tab.
3. Click on the **File Types** button to scroll down the list of registered file types.
4. Click **URL: Telnet Protocol**, then click on the **Edit** button. The **Edit File Type** dialog box displays.
5. Click **Open** from the **Actions** box by clicking on it, then click **Edit**.
6. Click **Browse** to choose your Telnet application, or enter the full path and file name of the Telnet application on your computer.

Microsoft Internet Explorer 4.0 or higher (PC)

Note: When you first install Internet Explorer, it should already be able to open a Telnet application (called *RUNDLL.32*). Follow these instructions if you wish to change the default Telnet application, or if a default Telnet application is not set.

---

1. Go to your Desktop.
2. Double-click **My Computer**.
3. Choose **View > Option**.
4. Click **File Types** tab then scroll down list of registered file types.
5. Click **URL: Telnet Protocol** and then click **Edit**.

6. Click **Edit** from the **Edit File Type** dialog box.
7. Click **Browse** to choose your Telnet application, or enter the full path and file name of the Telnet application on your computer. Your Telnet application displays in the **Application used to perform action** dialog box.

Launching Fabric Manager through Windows

You can launch Fabric Manager once Fabric Manager and the Java Plug-in are both installed on the workstation.

To launch Fabric Manager:

1. Choose **Start >Programs > Fabric Manager > Fabric Manager**. The **Address** dialog box displays.
2. Enter the switch name or IP address in the **Switch URL** field.

Note: This switch is assumed to be the local domain. If you want information specific to QuickLoop to be available, the QuickLoop switch must be the local domain.

---

3. Press **Enter** to submit the address.

Note: If an incorrect address or format is used, an error message displays, listing the formats that can be used. If this message displays, determine and enter the correct address.

Once a correct address is entered, Fabric Manager launches, displaying the **Fabric View**.

Adding the Browser Pathname to the Properties File

This is an optional step, and usually not necessary. However, if your browser is not working, you may need to edit the properties file 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 choose a text editor (such as Notepad) as the application for this file.

3. Enter a new line starting with `BrowserPath=`, followed by the correct pathname for the browser, in quotes. 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 only access 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. Choose **Start > Settings > Control Panel**.
2. Double-click the **Add/Remove** control panel.
3. On the **Install/Uninstall** tab of the control panel, choose *Fabric Manager* application and click **Add/Remove**. A dialog box displays warning that you are about to uninstall Fabric Manager.
4. Click **Uninstall** to continue. A dialog box showing the progress of the uninstallation displays. When the uninstallation is complete, the **Uninstall Complete** dialog box displays.
5. Click **Exit**.

Fabric Manager View

3

This chapter provides the following information:

- Overview on page 42
- Options available in the Fabric Manager View on page 45

Overview

Fabric Manager detail view is the first view that displays when you launch Fabric Manager, and it provides access to specific information about the fabric and switches through a panel representing each switch. Every switch in the fabric is represented by a switch panel in Fabric View.

Accessing Fabric Manager View

Launch Fabric Manager and access the Fabric Manager View. For information about launching Fabric Manager, see "Launching Fabric Manager through Windows" on page 38.

Fabric Manager launches, displaying the **Fabric View** (default), as shown in Figure 1.

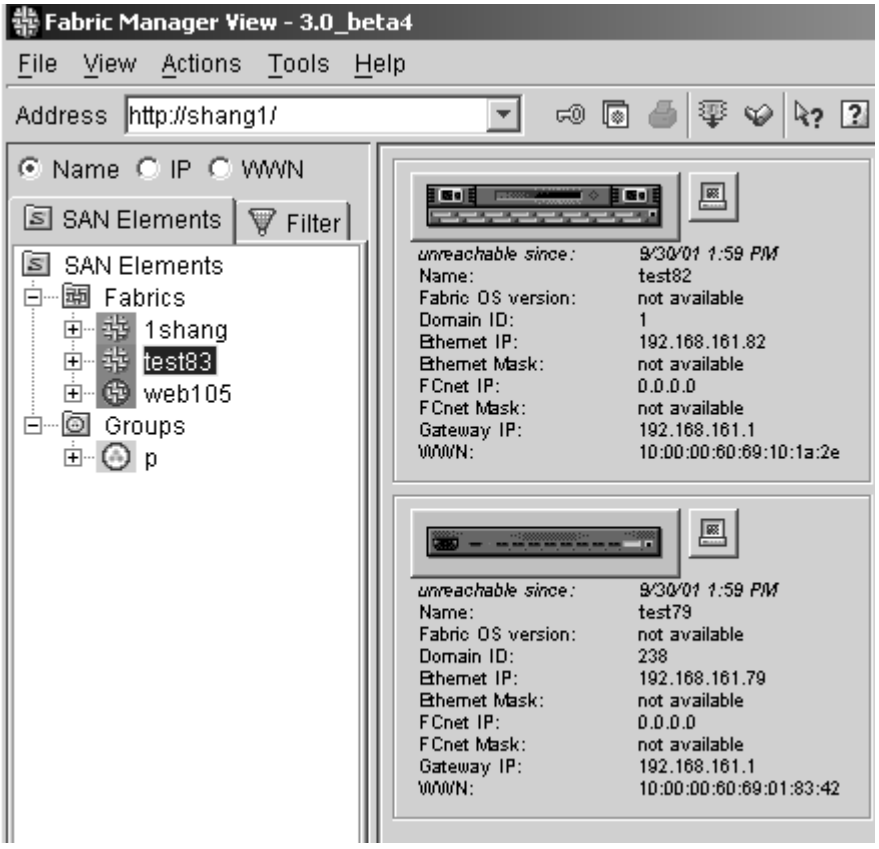


Figure 1: Fabric Manager View

Figure 2 shows the Fabric Manager View with the Fabric Icon selected.

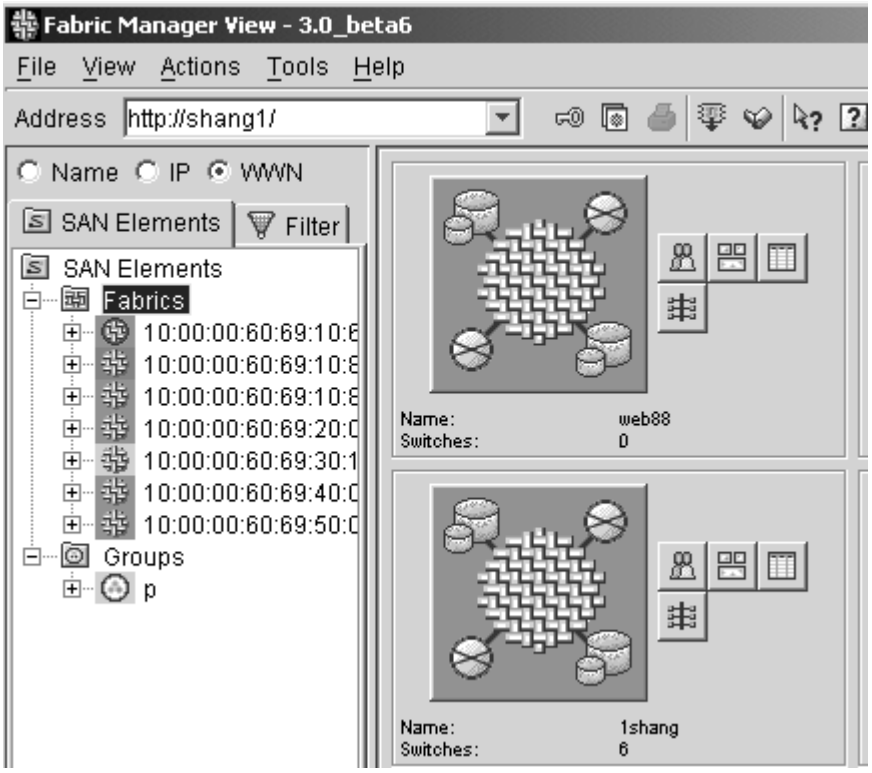


Figure 2: Fabric Manager View with the Fabric icon selected

For more information, see "SAN Elements Tab Icons" on page 49.

Options available in the Fabric Manager View

The following section provides an overview of the options available through the Fabric View area of Fabric Manager.

Menus

The Menus portion of the Fabric Manager View is shown in Figure 3.

Figure 3: Fabric Manager View menus

Table 3 lists the options available in the Fabric Manager View:

Table 3: Available Options on the Fabric Manager View

View	Options
File >	The **File** drop-down list provides the following options: ■ New ■ Close ■ Fabric Login ■ Groups — Create — Import — Export ■ Options... ■ Log... ■ Print... ■ Exit For more information, see "File Menu" on page 57.
View >	The **View** drop-down list provides the following options: ■ Detail ■ Summary ■ Table For more information, see "View Menu" on page 79.

Table 3: Available Options on the Fabric Manager View (Continued)

Actions >	The **Actions** drop-down list provides the following options: ■ Switch View ■ Events ■ Admin ■ Fabric Watch ■ Telnet ■ Zone Admin ■ Name Server ■ ISL — ISL Checking — Restamp ■ Set Time ■ Fabric Checking For more information, see "Actions Menu" on page 83.
Tools >	The **Tools** drop-down list provides the following options: ■ Download Firmware ■ Reboot — Create Reboot Sequence — Sequence Reboot ■ Config — Save Baseline — Compare/Download from File — Compare/Download from Switch ■ Licensing — Import from File — Load from Switch ■ Fabric Merge For more information, see "Tools Menu" on page 97.

Table 3: Available Options on the Fabric Manager View (Continued)

Help >	The **Help** drop-down list provides the following options: ■ Help ■ Context Help ■ Status Legend ■ About For more information, see "Help Menu" on page 111.

Tool Bar

Table 4 lists a brief description of the options available in the Fabric View Tools bar.

Table 4: Available Options on the Fabric View Tools Bar

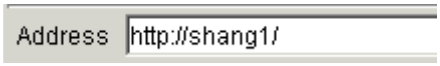
Option	Description
Address dialog box 	Enter the IP address, name, or WWN of the switch that you want to manage or monitor. Once the switch information has been entered, the address can be chosen automatically from the drop-down list.
Fabric Login Icon 	Click the switches that you want to login to. For more information about this option, see "Fabric Login Icon" on page 121.
Open FM Log Icon 	Click to open the Fabric Manager Log. For more information about this option, see "Fabric Manager Log" on page 74.
Print Table Icon 	Click to print a table report. For more information, see "Print Table Icon" on page 126 or "Print" on page 73.

Table 4: Available Options on the Fabric View Tools Bar (Continued)

Download Firmware Icon	Click to set up firmware downloads for multiple switches at once. For more information about this option, see "Download Firmware" on page 99.
Sequenced Reboot Icon	Click to set up switches to reboot in a chosen order. For more information, see "Sequenced Reboot" on page 103 or "Set up a Sequenced Reboot" on page 151.
Context Sensitive Help Icon	Click to view Context Sensitive Help. For more information about this options, see "Context Sensitive Help Icon" on page 132.
Help Icon	Click to view the Help section. For more information, see "Help" on page 134 or "Help" on page 112.

For more information about the Tool Bar options available in Fabric Manager, see "Tool Bar" on page 119.

SAN Elements Panel

Use the SAN Elements Panel to view, choose, and search for the elements of a SAN (fabrics and/or groups) by their IP address, Name, or WWN.

SAN Elements Tab

The SAN Elements tab of the Fabric Manager View is shown in the default view in Figure 4.

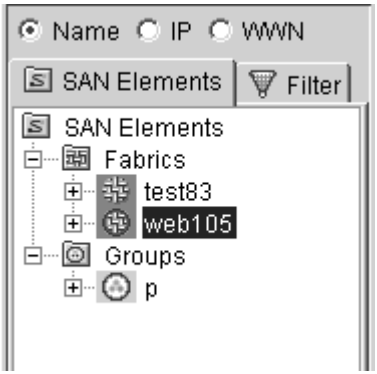


Figure 4: SAN Elements dialog box

The Navigation Tree control of the SAN Elements Panel displays various nodes, such as fabrics, groups, reboot groups, devices, switches, ports, etc. Some views in Fabric Manager may show only some nodes, but not others. A filter tab may be displayed on some views so that you can search for switches by their properties.

SAN Elements Tab Icons

Table 5 lists a brief description of the options available in the SAN Elements tab:

Table 5: SAN Elements Tab Options

Options	Descriptions
Fabric Icon	Click the Fabric Icon from the SAN Elements column to view a fabric view of the entire fabric, rather than individual switches. See "Switch and Fabric Icons Available in Fabric View" on page 52.
ISL Checking **A**— **B**— **C**— **D**—	Displays the status of ISL Checking. **A**—Displays by default when ISL Checking is OFF and fabric checking is OFF. **B**—Displays when ISL Checking is ON, but fabric checking is OFF. **C**—Displays when ISL Checking is OFF, but fabric checking is ON. **D**—Displays when ISL Checking is On, and fabric checking is ON.
Clicking on the word "Fabrics" in the navigation tree causes the following icons to display in the right-hand dialog box:	
Fabric Events	Click to open Fabric Events View.
Zone Admin	Click to open the Zone Admin View.
Name Server	Click to open the Name Server.
Fabric Topology	Click to open the Fabric Topology view. For information, refer to the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*.

Table 5: SAN Elements Tab Options (Continued)

Clicking on the word "Groups" in the navigation tree causes the following icons display in the right-hand dialog box:	
Group Events	Click to open Fabric Events View. For information about this view, see "Events" on page 86.
Group Creation	Click to open the Group Creation dialog box.
Group Exportation	Click to open the Group Exportation dialog box.

Filter tab

Use the Filter tab of the SAN Elements dialog box to search for switches by IP Address, Name, Type, Version (FOS), WWN, or Domain ID. The Filter tab is shown in Figure 5.

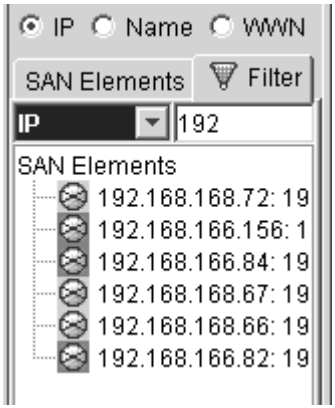


Figure 5: Filter tab of the SAN Elements dialog box

Switch View

Use the Switch View portion of the Fabric View to manage individual switches. Launching the Switch View in Fabric Manager actually launches a partner management tool called Web Tools. The Switch View is shown in Figure 6.

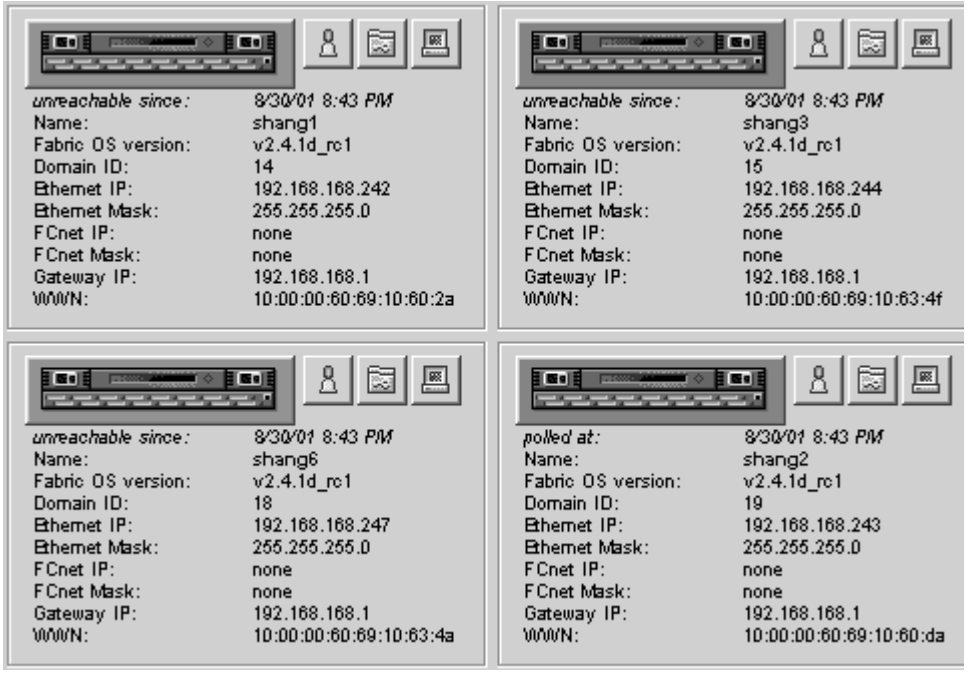


Figure 6: Switch View

Switch and Fabric Icons Available in Fabric View

Table 6 lists the available switch and fabric options in Fabric View:

Table 6: Available Switch and Fabric Options

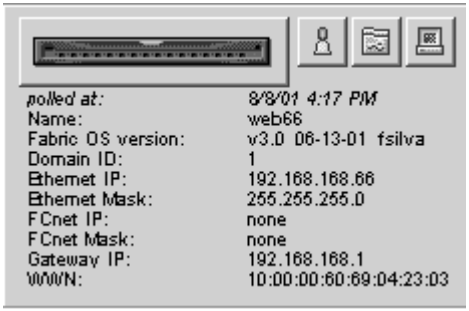
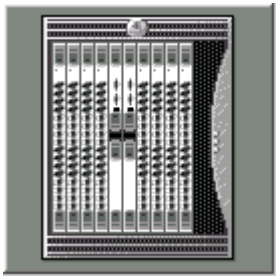
Options	Descriptions
Fabric and Group Select Icon	Click this icon in either fabric or group to view the associated fabric or group. The fabric or group is selected in the navigation tree.
Individual Switch Panel 	The Switch Panel representing an individual switch in the fabric. A Switch Panel displays for each individual switch in the fabric.
Integrated Fabric Panel 	The Switch Panel representing a integrated fabric. The components of the control panel are described in the following rows.
Individual Switch Icon	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.

Table 6: Available Switch and Fabric Options (Continued)

Fabric Events Button	Click to open Fabric Events View.
Events	Click to open Switch Events View to display the Switch Events log.
Admin	Click to open Switch Administration View.
Telnet	Click to launch the Telnet Interface for the switch.

Table 7 lists the Switch view fields and their descriptions:

Table 7: Switch View Field Descriptions

Switch View	Field Descriptions
Type	Displays a picture of the switch configuration.
polled at (or unreachable since:)	Displays the time of the last status check. If the switch is unavailable, this shows the time of the last successful status check.
Name	Displays the name of the switch.
Fabric OS version	Displays the version of Fabric OS installed on the switch.
Domain ID	Displays a number that uniquely identifies the switch within the fabric.
Ethernet IP	Displays the Ethernet IP address.
Ethernet Mask	Displays the Ethernet subnetmask.
FCnet IP	Displays the Fibre channel IP address.

Table 7: Switch View Field Descriptions (Continued)

Switch View	Field Descriptions
FCnet Mask	Displays the Fibre channel subnetmask.
Gateway IP	Displays the Gateway IP address.
WWN	Displays the unique numeric identifier for the switch; assigned by manufacturer.

File Menu

4

This chapter provides information on the options available through the drop-down lists of Fabric Manager. The File menu, as shown in Figure 7, provides the following options:

- New on page 58
- Close on page 59
- Fabric Login on page 60
- Groups on page 64
- Options on page 66
- Print on page 73
- Fabric Manager Log on page 74
- Exit on page 78

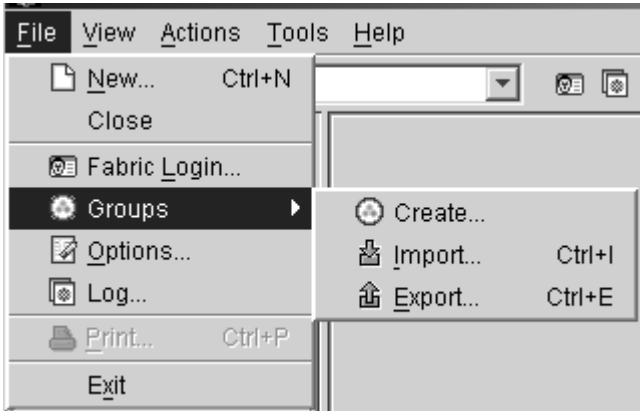


Figure 7: File menu

New

Use the New option in the File menu to open a new dialog box to view fabric information. Any dialog boxes that are currently active remain open.

Close

Use the Close option in the File menu to close the dialog box you are currently viewing. Any other dialog boxes that are currently active remain open.

Fabric Login

Use the Fabric Login option in the File menu to choose and set up a switch, or group of switches, to login to. Table 8 lists the fields available in the Fabric Login dialog box:

Table 8: Available Fields in the Fabric Login Dialog Box

Field	Description
User Id	Enter the User Id for a selected switch.
Password	Enter the Password for a selected switch.
IP, Name, WWN	Click the appropriate radio button to display a selected group of switches by IP address, name, or World Wide Name.
SAN Elements	Displays the fabrics or groups that belong to the Storage Area Network that the Admin is logged into.
Filter	Allows you to search for switches by IP address, Name, Type, FOS Version, WWN, or Domain ID.
Selected Switches:	
IP Address	Displays the IP address of the selected switch.
Switch Name	Displays the name of the selected switch.
Firmware Version	Displays the version of Fabric OS that is installed on the switch.
User Id	Displays the **User Id** of the individual who is logged into the switch.
Status	Displays the status of the switch login. Possible status reports are: Ready, Success, or Authorization Failed. When Success is displayed, the background is green and **User Id** and **Password** are saved for performing admin operations until the session is terminated. When Authorization Failed is displayed, the background is red and the **User Id** and **Password** are not saved in memory.
Test & Apply	Click to check **User Id** and **Password** login on the listed switches.

Table 8: Available Fields in the Fabric Login Dialog Box (Continued)

OK	Click to save configuration and exit dialog box.
Cancel	Click to cancel all changes made since changes were last applied, and to exit Fabric Login. Changes cannot be cancelled once they are applied.
Apply	Click to save configuration but leave dialog box open.

Setting up a Login for Multiple Switches

1. Choose **File > Fabric Login.** The **Fabric Login** dialog box displays, as shown in Figure 8.

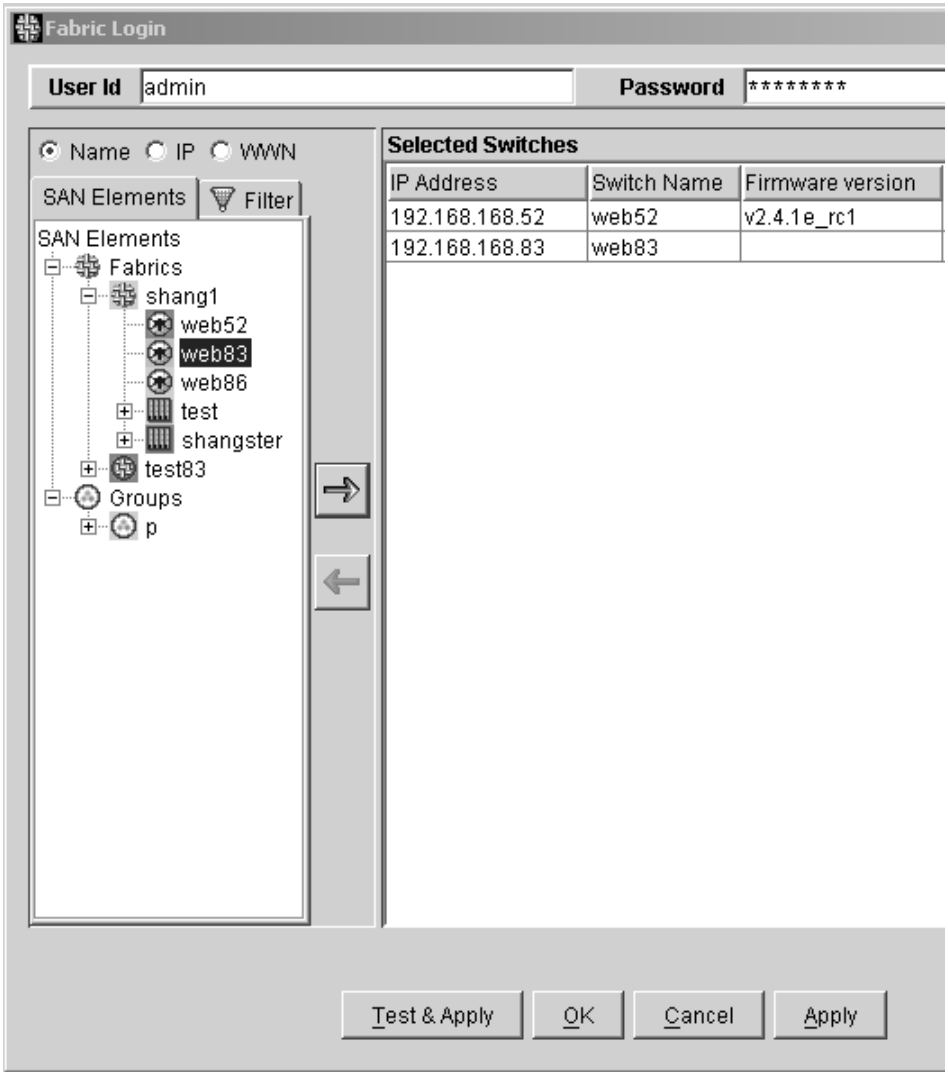


Figure 8: Fabric Login dialog box

2. Click **SAN Elements** tab to list the available elements by IP, Name, or WWN.
3. Choose a switch to set up and click on it to highlight.
4. Hold down the **Ctrl** key and choose any additional switches by clicking on them.

5. Click the button. The switch moves to the **Selected Switches** area.
6. Enter **User ID** and **Password** at the top of the dialog box.
7. Click **Test & Apply** to determine if login is accepted.
   or
   Click **OK** to save configuration and exit dialog box.
   or
   Click **Apply** to save configuration and keep dialog box open.

Groups

Use the Groups option in the File menu to create, import, and export groups of SAN elements.

Creating Logical Groups

To create a group of controllable SAN objects:

1. Choose **File > Group > Create.** The **Create Groups** dialog box displays, as shown in Figure 9.

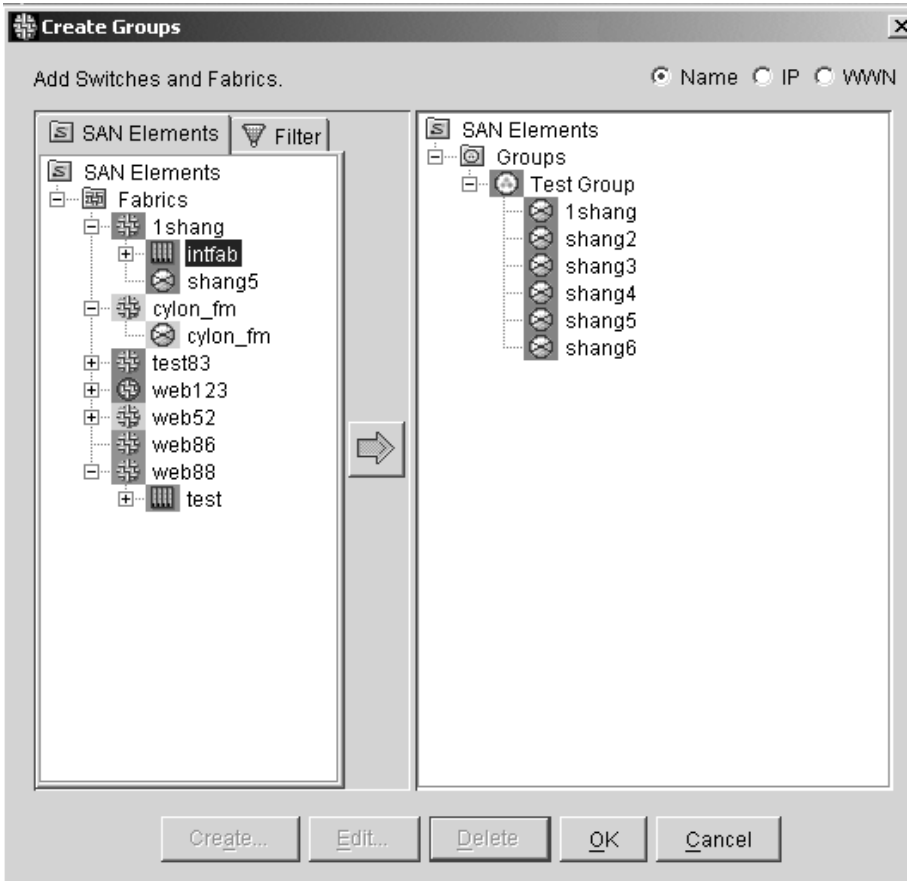


Figure 9: Create Groups dialog box

2. Highlight the word **Groups** (that you want to create a new group in) from the navigation tree.
3. Click **Create** from the bottom of the navigation tree dialog box. The **Create Groups** dialog box displays.
4. Enter a name for the group and press **OK**. The name of your group displays in the navigation tree.
5. Highlight the name of your group from the navigation tree by clicking on it.
6. Click switches from the left navigation tree to be added to the **Group**. To choose multiple switches, use **Shift/Click**.
7. Add selected switches to your group by clicking on the right-arrow button, or by dragging and dropping selections from the navigation tree to the **Group**.

Importing a Group

To import a group of controllable SAN objects:

1. Choose **File > Group**.
2. Click **Import.** A browser dialog box displays.
3. Browse to the XML file that was previously exported and choose it. The imported groups display in the navigation tree under Groups.

Exporting a Group

To export a group of controllable SAN objects:

1. Choose **File > Group.**
2. Click **Export.** The **Export** dialog box displays.
3. Click **Browse** to locate and choose the file to export. The name of the file should display in the **File** field.
4. Choose the groups that you want to export from the navigation tree.
5. Move the selected groups to the **Export** table by using the left-arrow or by dragging and dropping.
6. Click **OK**. The file is created.

Options

Use the Options function under the File menu to do:

- File Transfers
- Check Logging Parameters
- Check ISL Status
- Fabric Change

File Transfer Tab

The File Transfer tab of the Options dialog box is used to transfer files from a Host IP to a Remote IP.

Transferring Files

To transfer files from a host IP to a remote IP by either Remote Shell or FTP:

1. Choose **File > Options** menu. The **Options** dialog box displays.
2. Click **File Transfer** tab. The **File Transfer** tab displays, as shown in Figure 10.

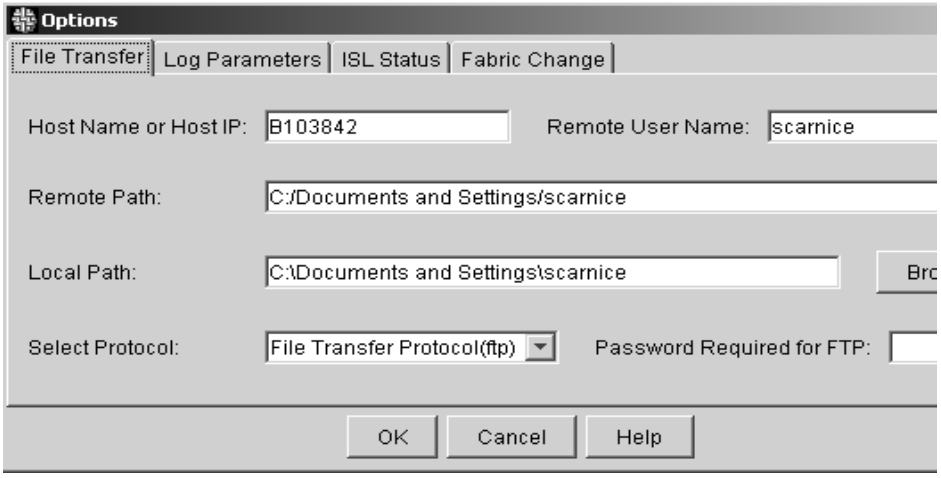


Figure 10: File Transfer tab of the Options dialog box

3. Enter the **Remote Host IP** that ftp or rsh daemon is running on.

4. Enter the **Remote User name** of the rsh or ftp program.
5. Enter the **Remote Path** that the rsh or ftp program used for the file.
6. Choose either **Remote Shell** or **FTP** protocol from **Select Protocol** drop-down list.

Note: If FTP is the desired protocol, enter a password in the **Password Required for FTP** field.

---

7. Click **OK**.

Log Parameters Tab

Use the Log Parameters tab of the Options dialog box to set the path and priority levels for events in the fabric.

Setting Log Parameters

To set log parameters

1. Choose **File > Options** menu. The **Options** dialog box displays.
2. Click **Log Parameters** tab. The **Log Parameters** tab displays, as shown in Figure 11.

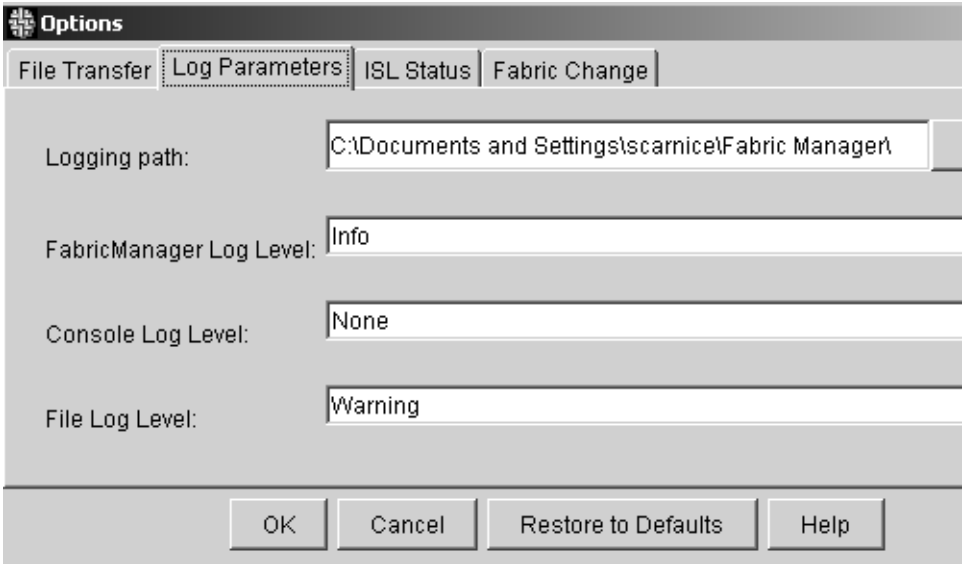


Figure 11: Log Parameters tab of the Options dialog box

3. Browse to locate and choose the **Logging path** that is used to create a log sub-directory.
4. Choose a priority for the **FabricManager Log Level** from the drop-down list.
5. Choose a priority for the **Console Log Level** from the drop-down list.
6. Choose a priority for the **File Log Level** from the drop-down list.
7. Click **OK** to apply the settings.

ISL Status Tab

Use the ISL Status tab in the Options dialog box to set various ISL status parameters. Table 9 lists the fields available in the ISL Status tab:

Table 9: Available Fields on the ISL Status Tab

Field	Description
Incorporate Adds into Stamp	Check box if: You want the ISL Stamp to change when additions are made to the fabric. Uncheck box if: You do *not* want the ISL Stamp to change when additions are made to the fabric.
Add Conflict Status	Choose Yellow or Red, depending on which color you want to display when Fabric Manager detects that one or more ISLs cannot be monitored due to conflicting ISL Add events. An Add Conflict occurs when two valid ISLs are set to be monitored for the same port in the stamp.
Add Status	Choose Yellow or Red, depending on which color you want to display when an ISL connection has been added.
Remove Status	Choose Yellow or Red, depending on which color you want to display when an ISL connection is removed. Because Remove Direct Connection Status is considered a high priority, the Remove Status priority cannot be set higher than the Remove Direct Connection Status.
Remove Direct Connection Status	Choose Yellow or Red, depending on which color you want to display when a Fabric Manager detects that a direct physical connection has been removed. A Remove Direct Connection occurs when no direct path exists, although there is still an indirect path between switches.
Move Status	Choose Yellow or Red, depending on which color you want to display when a Move event occurs. A Move event occurs when one end of an ISL is moved from one port to another, but is still connecting the same switches and one end of the connection has not moved.
OK	Click to save ISL status parameters.
Cancel	Click to exit without saving changes.

Setting ISL Status Parameters

To set ISL status levels to be reported in ISL checking:

1. Choose **File > Options**. The **Options** dialog box displays.

2. Click **ISL Status** tab. The **ISL Status** tab displays, as shown in Figure 12.

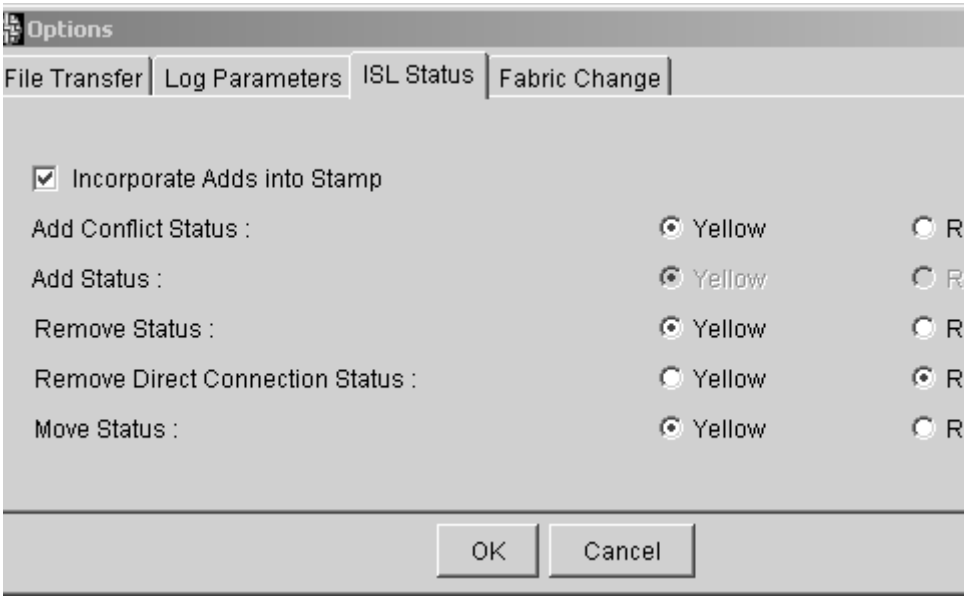


Figure 12: ISL Status tab in the Options dialog box

3. Click the **Yellow** or **Red** radio buttons to choose the desired color to display when Add, Remove, or Move events occur (fabric and switch events display in the Fabric Events dialog box).
4. Click **OK** to apply the settings.

Fabric Change Tab

Use the Fabric Change tab in the Options dialog box to enable or disable automatic fabric checking. Table 10 lists the available fields and descriptions in the Fabric Change tab:

Table 10: Available Fields on the Fabric Change Tab

Field	Description
Automatically check fabrics	Check box to automatically check for new fabrics that are discovered.
Fabric Change Handling:	

Table 10: Available Fields on the Fabric Change Tab

Allow Adds	Click if you want switches to be added to the Fabric View when the fabric is checked.
No Changes	Click if you do *not* want the fabric to change (due to additions) after the fabric is checked.
OK	Click to save changes to Fabric Change Handling.
Cancel	Click to exit dialog box without saving changes.

Enabling Automatic Fabric Checking

To enable automatic Fabric Checking and to set Fabric Change handling:

1. Choose **File > Options**. The **Options** dialog box displays.
2. Click **Fabric Change** tab. The **Fabric Change** tab displays, as shown in Figure 13.

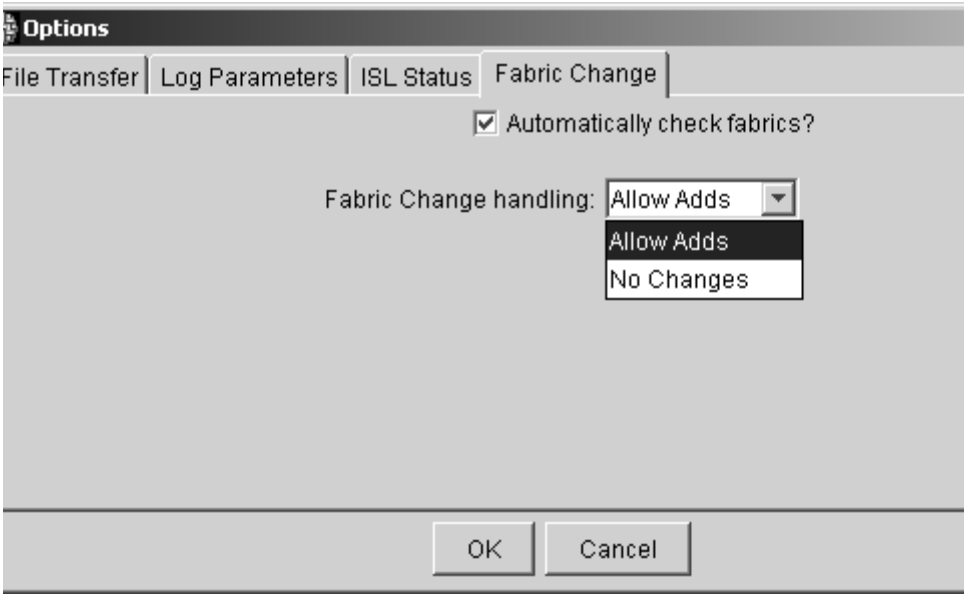


Figure 13: Fabric Change tab in the Options dialog box

3. Choose **Automatically Check Fabrics** to automatically check new fabrics that are discovered.

4. Choose **Allow Adds** from the drop-down list if you want additions in the fabric to cause a change in the Fabric View.
   or
   Choose **No Changes** if you do not want additions in the fabric to cause a change in the Fabric View.
5. Click **OK** to save and apply changes.

Print

Use the Print option in the File menu to print table reports for review.

Printing Reports

To print a report:

1. Choose **View > Table.** The **Fabric View** changes from an icon view to a table format.

Note: You can only print reports from the Table View.

2. Choose **File > Print.**

Fabric Manager Log

Use the Fabric Manager Log in the File menu to view events occurring within the fabric. Table 11 lists the available fields and descriptions in Fabric Manager Log:

Table 11: Available Fields on the Fabric Manager Log

Field	Description
Severity	Displays the log levels, such as Debug, Info (information), Warning, or Error.
Time	Displays the time an event occurred.
Module	Displays which sub-module (or service), such as Discovery, or License generated the log entry.
Message	Displays messages regarding events occurring within the fabric, such as switch removal and discovery.
Search	Click to launch the Search dialog box and search for particular data, such as specific messages, severities, modules, and time ranges. The Search dialog box is shown in Figure 15.
Filter	Click to choose which aspects you want to have shown in the FM Log. This keeps the log from getting crowded with unwanted information. The Filter dialog box is shown in Figure 16.
Close	Click to close the dialog box.

Viewing the Fabric Manager Log

Choose **File > Fabric Manager Log** to view the Fabric Manager Log. The **Fabric Manager Log** displays, as shown in Figure 14.

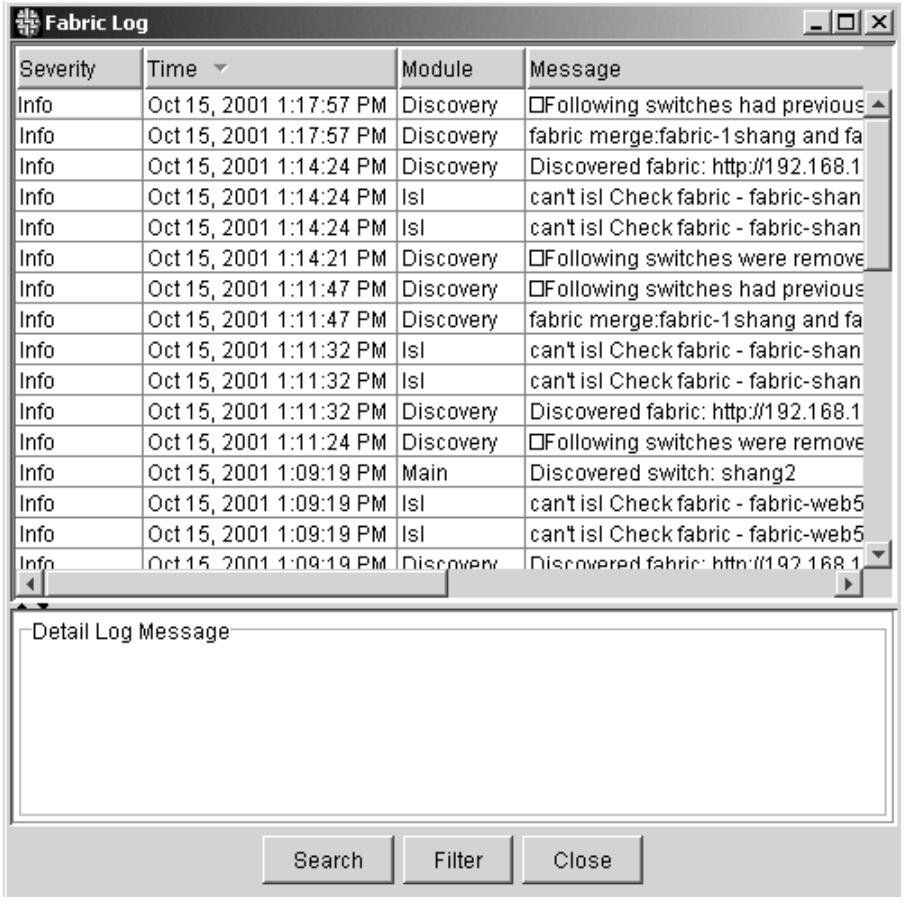


Figure 14: Fabric Manager Log dialog box

Searching the Fabric Manager Log

Use the Search dialog box to locate specific events.

Searching for Fabric Data

To locate specific events, messages, or time ranges within the fabric:

1. Choose **File > Fabric Manager Log**. The **Fabric Manager Log** dialog box displays, as shown in Figure 14.

2. Click **Search** at the bottom of the dialog box. The **Search Dialog** box displays, as shown in Figure 15.

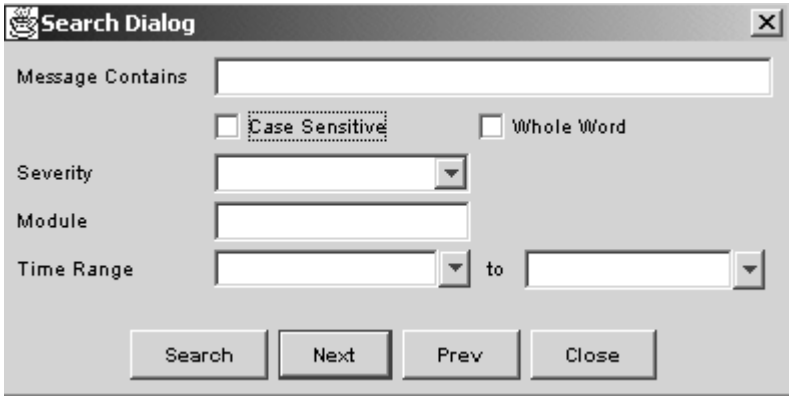


Figure 15: Search dialog box

3. Enter a message to search the fabric for (specifying **Case Sensitive** or **Whole Word**, if desired).
4. Choose a severity from the **Severity** drop-down list.
5. Enter a **Module** to search the fabric for.
6. Choose a time range from both **Time Range** drop-down lists.
7. Click **Search** to begin a search using the assigned parameters.
   or
   Click **Next** to choose the next switch in the **Fabric Manager Log** list.
   or
   Click **Prev** to choose the previous switch in the **Fabric Manager Log** list.

Filtering the Fabric Manager Log

Use the Filter dialog box to determine which events you want to display in Fabric Events. This prevents the Fabric Events dialog box from becoming cluttered with unnecessary information.

Filtering Fabric Events

To filter specific events such as messages, and time ranges within the fabric:

1. Choose **File > Fabric Manager Log.** The **Fabric Manager Log** dialog box displays, as shown in Figure 14.

2. Click **Filter** at the bottom of the dialog box. The **Filter Dialog** box displays, as shown in Figure 16.

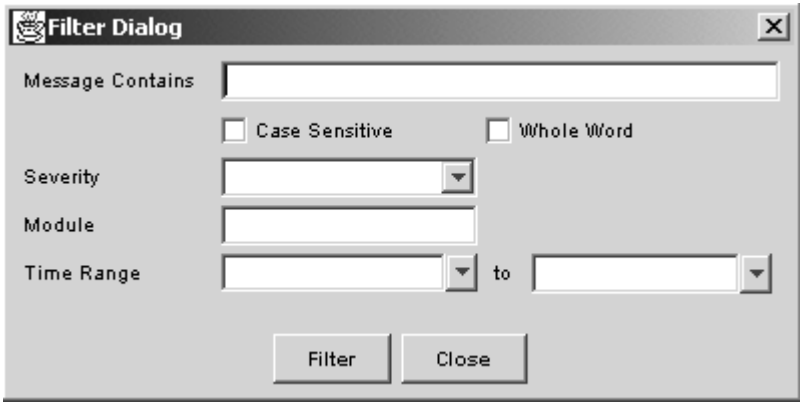


Figure 16: Filter dialog box

3. Enter a message to filter the fabric for (specifying **Case Sensitive** or **Whole Word**, if desired).
4. Choose a severity from the **Severity** drop-down list.
5. Enter a **Module** to filter within the fabric for.
6. Choose a time range from both **Time Range** drop-down lists.
7. Click **Filter** to begin filtering the assigned parameters.

Exit

Use the Exit option in the File menu to close the *Fabric Manager* application.

View Menu

5

This chapter provides information on the options available through the View drop-down list of Fabric Manager.

The View option of the drop-down list provides the following options:

- Detail on page 80
- Summary on page 81
- Table on page 82

The View Menu is shown in Figure 17.

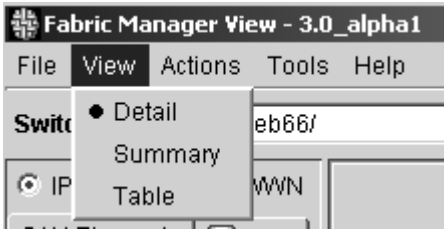


Figure 17: View menu

Detail

Use the Detail option in the View Menu to see a Fabric View of the switches that includes information such as the Domain ID and the IP Address. The Detailed option of the View menu is shown in Figure 18.

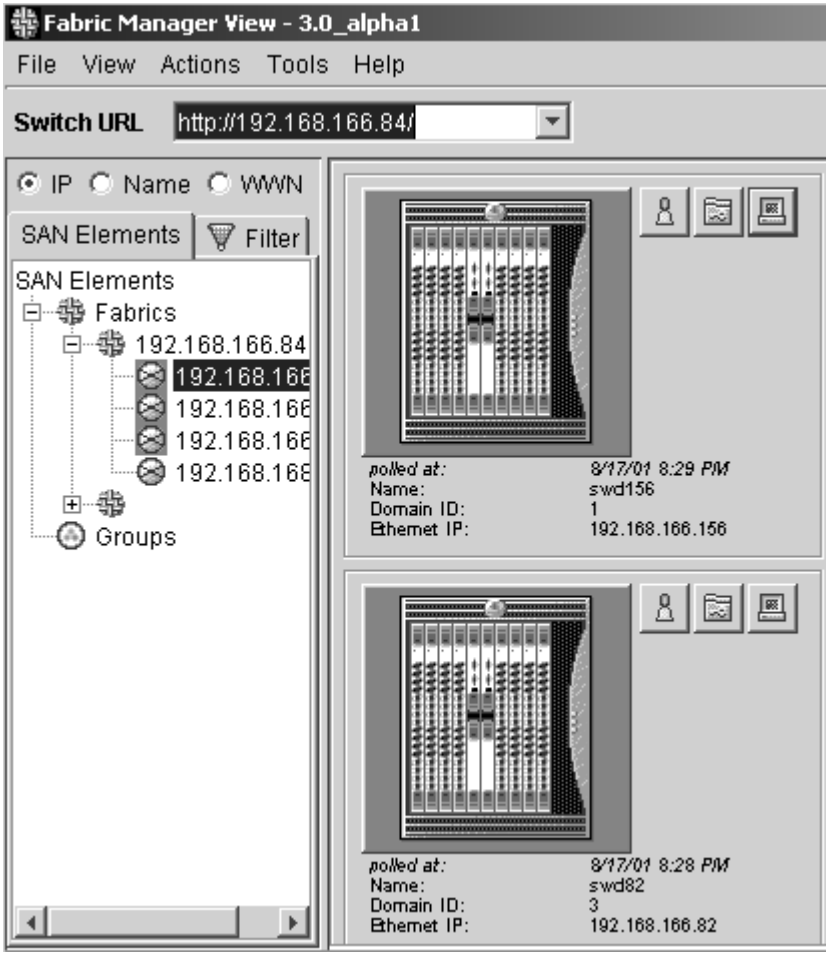


Figure 18: Detailed option of the View menu

Summary

Use the Summary option in the View Menu to see a Fabric View that provides a brief overview of the fabric information, rather than more detailed information. The Summary dialog box is shown in Figure 19.

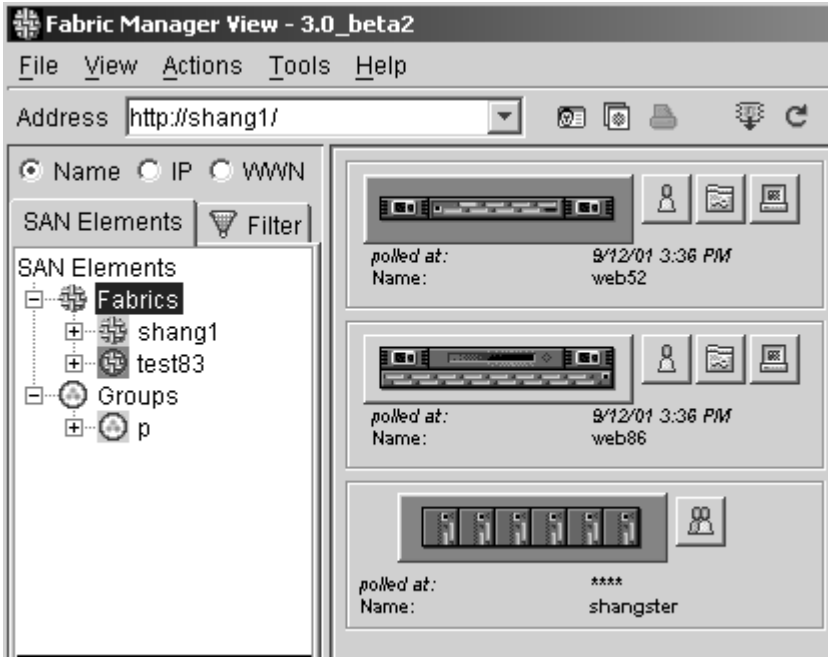


Figure 19: Summary option of the View menu

Table

Use the Table option in the View menu to view and sort switch information in a table-form, rather than in a graphic-form. The Table option of the View menu is shown in Figure 20.

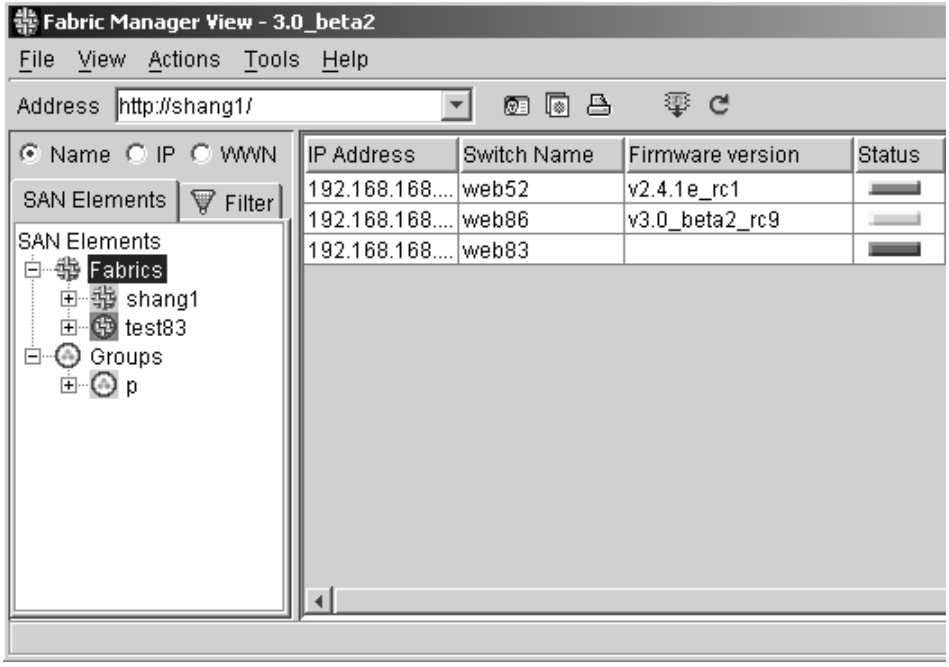


Figure 20: Table dialog box of the View menu

Printing Table Reports

The Table View is the only view that allows you to use the Print option. For more information, see “Print” on page 73.

Actions Menu

6

This chapter provides information on the options available through the Actions drop-down list of Fabric Manager.

The Actions drop-down list provides the following options:

- Switch View on page 85
- Events on page 86
- Admin on page 88
- Fabric Watch (Optional) on page 89
- Telnet on page 90
- Zone Admin on page 91
- Zone Admin on page 91
- Name Server on page 92
- ISL on page 93
- Set Time on page 95
- Fabric Checking on page 96

Note: The options that are available in the Actions menu vary depending on what has been selected on the tree control.

The Action Menu is seen in Figure 21.

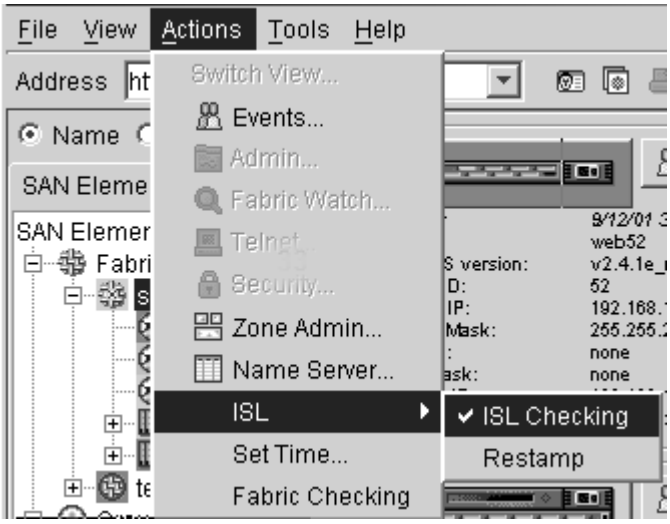


Figure 21: Actions menu

Switch View

Use the Switch View option of the Actions Menu to open a Web Tools dialog box. For more information, look for the Switch View topic in the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*.

Events

Use the Events option of the Actions Menu to view a log of events for all switches in the fabric. The Events dialog box is shown in Figure 22.

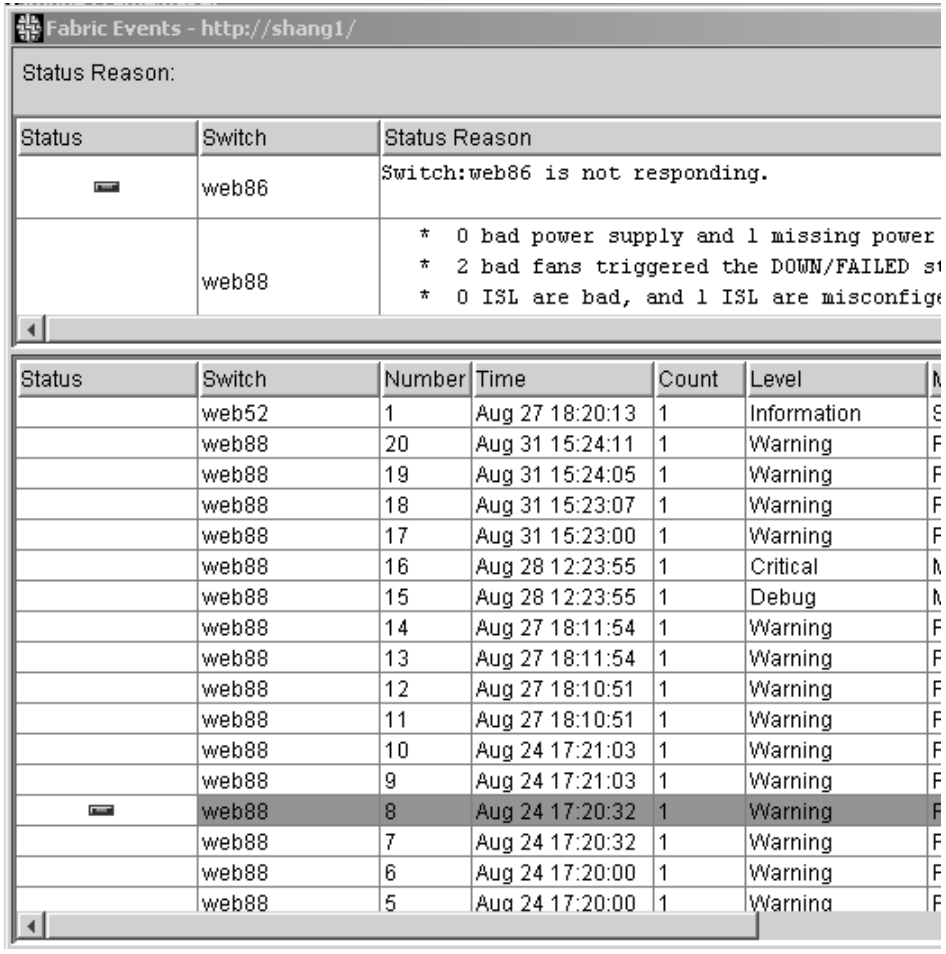


Figure 22: Events dialog box

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

Table 12 lists the available fields and descriptions in the Events option:

Table 12: Available Fields on the Events Option

Field	Description
Status Reason Section:	The upper area of the Events dialog box describes events that have changed the status of a switch. Entries in this area no longer display once the issue has been resolved. Some of the events are generated by Fabric Manager, and not by the switch.
Print	Click to print the Fabric Events dialog box.
Status	Displays the status this event caused.
Switch	Displays the name of the switch that has had a change in status.
Status Reason	Displays the reason that the switch has had a change in status.
Event Log Section:	The lower area of the Events dialog box is a log of all the events that have been detected by the switch.
Status	Displays the status this event caused.
Switch	Displays the name of switch.
Status Reason	Displays the reason for a noted event.
Num... (number)	Displays the event number for affected switch.
Time	Displays the time of the event.
Count	Displays the number of consecutive occurrences of the same event.
Level	Displays the severity level of the event: ■ 0 panic (switch reboots) ■ 1 Critical ■ 2 error ■ 3 warning ■ 4 information ■ 5 debug
Message	Displays a description of the event.

Admin

When using the Admin option, you are actually accessing Web Tools.

For more detailed information regarding Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*.

Fabric Watch (Optional)

When using the Fabric Watch option, you are actually accessing Fabric Watch through Web Tools.

For more detailed information regarding Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide* or the *HP StorageWorks Fabric Watch Version 3.0.x/4.0.x User Guide*.

Telnet

When using the Telnet option, you are actually accessing Telnet through Web Tools.

For more detailed information regarding Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide* or the *HP StorageWorks Fabric OS Version 3.0.x/4.0.x Reference Guide*.

Zone Admin

When using the Zone Admin option, you are actually accessing Web Tools.

For more detailed information regarding Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide* or the *HP StorageWorks Zoning Version 3.0.x/4.0.x User Guide*.

Name Server

When using the Name Server option, you are actually accessing Web Tools.

For more detailed information regarding Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide.*

ISL

Use the ISL option to record and monitor the ISL configuration for a fabric. There are two separate actions that can be taken when using the ISL option:

- ISL Checking
- Restamp (available only when ISL Checking is enabled)

Note: ISL Checking requires FOS 26 or later. The ISL feature is grayed out if the launch switch is running a version of FOS prior to 26 (even if switches under the launch switch are running versions of FOS).

Enabling and Disabling ISL Checking

When ISL Checking is enabled, a snapshot (or stamp) is taken of the topology. When a change occurs in the ISLs, the detailed information is shown on the Status Reason section of the Events page. For more information about Events, see "Events" on page 86.

To enable ISL checking:

1. Choose **Actions > ISL > ISL Checking.** A check mark displays, showing that ISL checking is enabled and the node icon changes. When ISL checking is turned on, the following changes take place:
   - If an event occurs, the **Status Legend** color changes to represent the appropriate Event.
   - Any events are shown in the **Fabric Events** dialog box.

To disable ISL checking:

Choose **Actions > ISL > ISL Checking.** A check mark displays, showing that ISL checking is disabled and the node icon changes.

Note: For more information, refer to the "SAN Elements Panel" on page 48.

Using Restamp

To restamp the fabric topology, and have the most current topology information noted in Fabric Events, use the Restamp option. This option is only available when ISL Checking has already been enabled.

1. Ensure that ISL Checking is enabled. See "Enabling and Disabling ISL Checking" on page 93 and the follow the instructions to enable.
2. Choose **Actions > ISL > Restamp**. A snapshot is taken of the fabric.
3. Choose **Actions > Fabric Events**. View the latest changes within the fabric in the top of the **Fabric Events** dialog box.

Set Time

Use the Set Time option set and change the time on a fabric or an individual switch. The Set Time dialog box is shown in Figure 23.

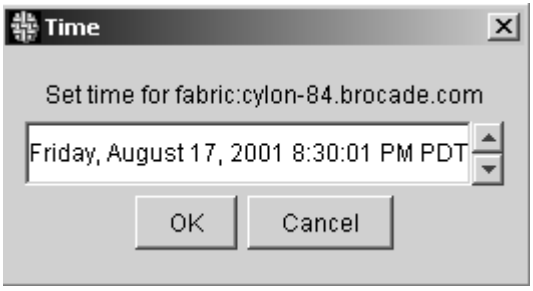


Figure 23: Set Time dialog box

Fabric Checking

Use the Fabric Checking option of the Actions menu to determine what changes or updates display in the Fabric View.

Enabling and Disabling Fabric Checking

To enable Fabric Checking, choose **Actions > Fabric Checking**. A check mark displays.

To disable Fabric Checking, choose **Actions > Fabric Checking**. The check mark disappears.

Tools Menu

7

This chapter provides information on the options available through the Tools drop-down list of Fabric Manager. The Tools drop-down list provides the following options:

- Download Firmware on page 99
- Reboot on page 102
- Config on page 105
- Licensing on page 106
- Fabric Merge on page 108

The Tools Menu is shown in Figure 24, Figure 25, and Figure 26.

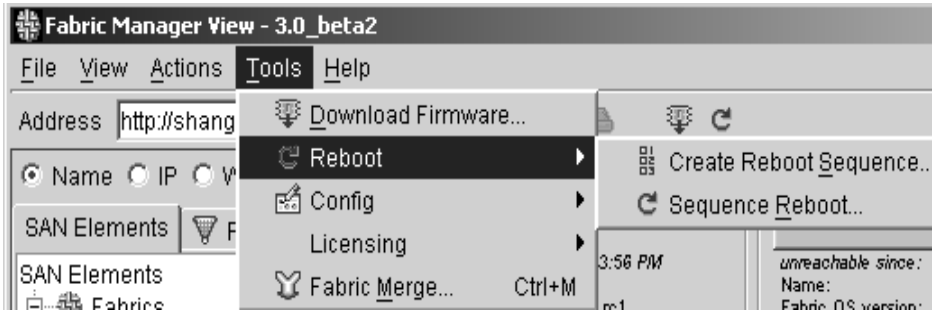


Figure 24: Tools menu with Reboot options

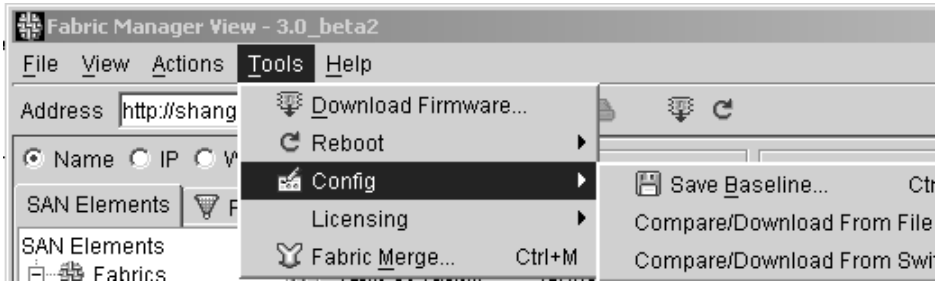


Figure 25: Tools menu with Config options

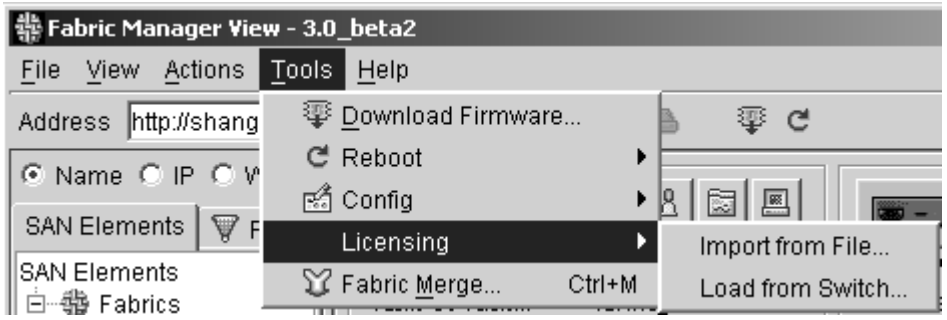


Figure 26: Tools menu with Licensing options

Download Firmware

Use the Download Firmware option of the Tools menu to download new firmware to the fabric. The Download Firmware dialog box is shown in Figure 27. The Download Firmware dialog box can also be displayed by selecting the **Download Firmware** icon located in the Tool Bar.

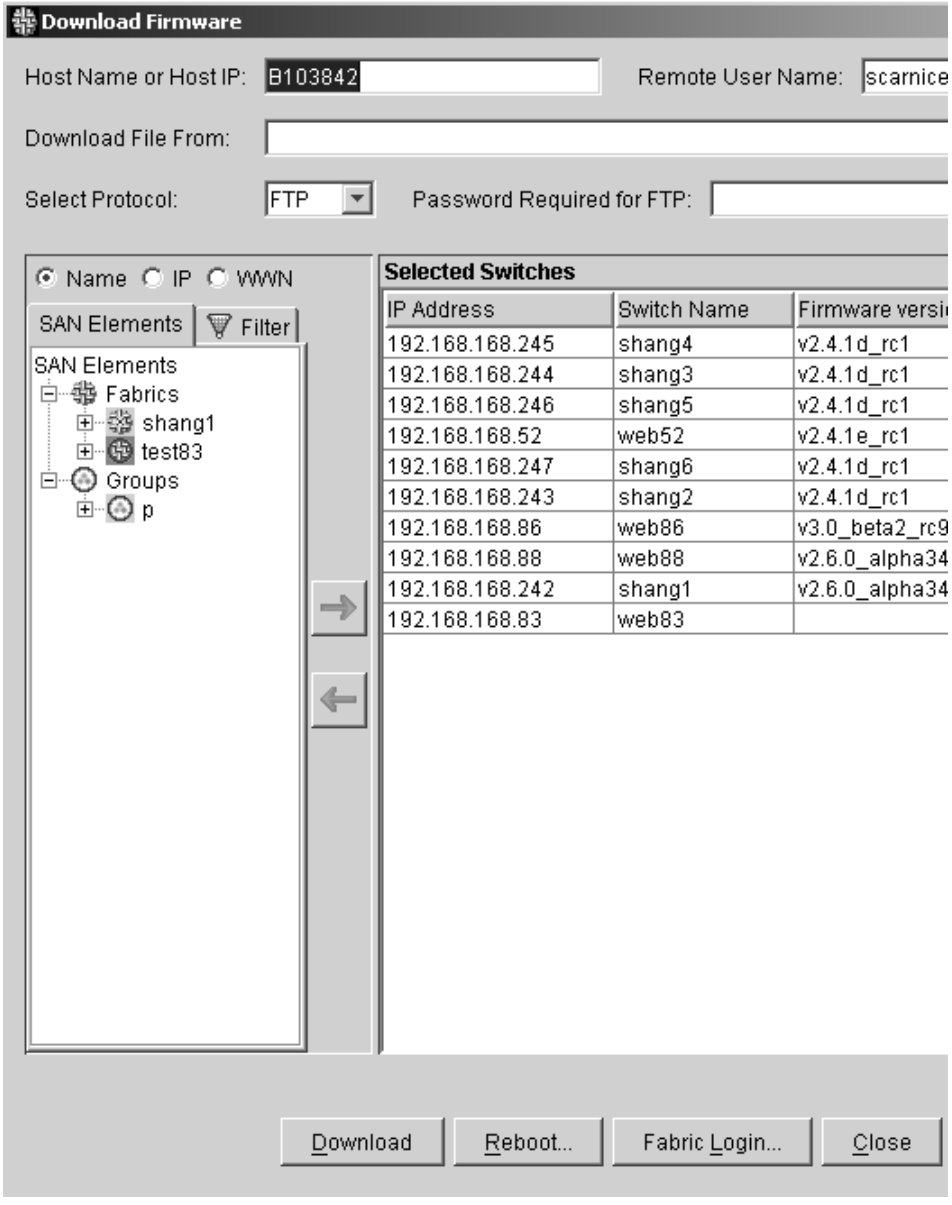


Figure 27: Download Firmware dialog box

Downloading Firmware to Multiple Switches

For instructions on downloading firmware, see “Downloading Firmware to Multiple Switches” on page 129.

Reboot

Use the Reboot option of the Tools menu to manage switch reboots and minimize interruption of switch access. The Reboot option provides the following detailed options:

- Create Reboot Sequence
- Sequence Reboot

Create Reboot Sequence

Use the Create Reboot Sequence option to create a reboot group and sequence. The Create or Change Reboot Groups and Sequence dialog box displays, as shown in Figure 28.

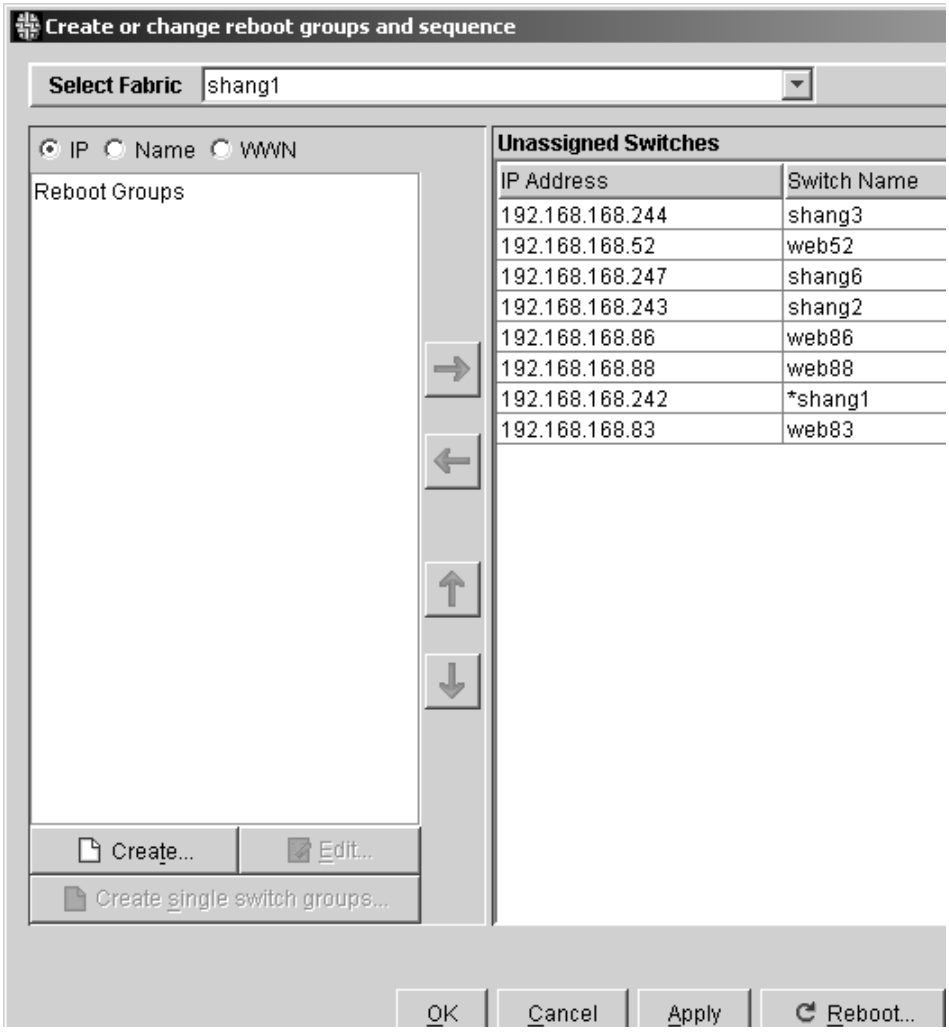


Figure 28: Create or Change Reboot Groups and Sequence dialog box

Sequenced Reboot

Use the Sequence Reboot option to set up a group of switches to be rebooted in a chosen sequence. The Sequence Reboot dialog box is shown in Figure 29.

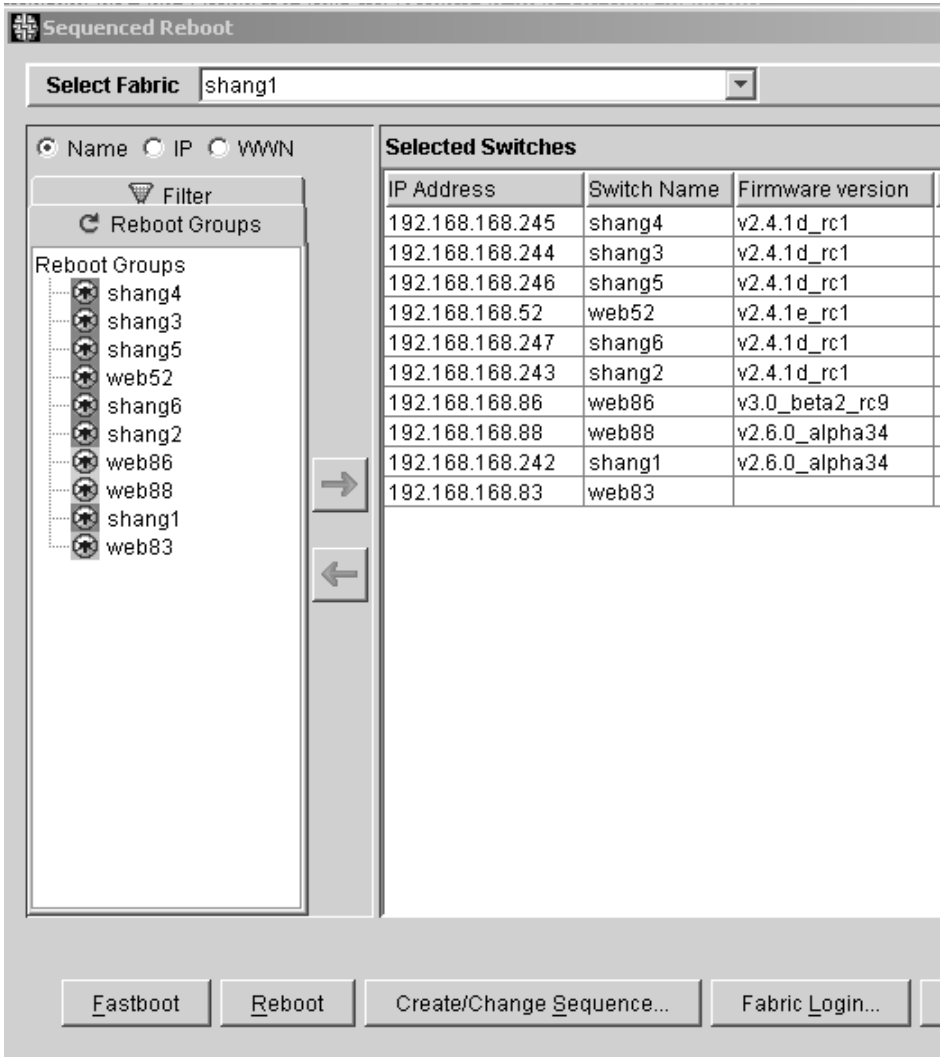


Figure 29: Sequence Reboot dialog box of the Reboot menu

Config

Use the Config option of the Tools menu to create and apply “Baseline” configurations across multiple switches. The Config option provides the following submenus:

- Save Baseline
- Compare/Download from File
- Compare/Download from Switch

Creating a Baseline Switch Configuration

For information on creating a Baseline Switch Configuration, see “Save a Baseline Configuration” on page 145.

Comparing or Downloading a Switch Configuration from a File

For information, see **“**Download and Apply a Baseline Configuration**”** on page 146.

Comparing or Downloading a Switch Configuration from a Switch

For information, see **“**Download and Apply a Baseline Configuration**”** on page 146.

Licensing

Use the Licensing option of the Tools menu to administer and manage licensing information. The Licensing option provides the following submenus:

- Import from File
- Load from Switch

Importing a License from a File

To import a license from a local file:

1. Choose **Tools > Licensing > Import From File**. A browser dialog box displays.
2. Browse to choose the file that contains the license to be imported.
3. Click **OK**.

Loading a License from a Switch

To view and change licensing information on a switch or fabric, use the License Admin dialog box:

1. Choose **Tools > Licensing > Load From Switch**. The **License Admin - Switch Selection** dialog box displays.
2. Choose the switch from which you want to load a license.
3. Click **Login** and log in to switch (if you have not already done so).
4. Click **OK**. The **License Admin** dialog box displays, as shown in Figure 30.
5. Click **Switch** tab.
6. Click **Load From Switch**.

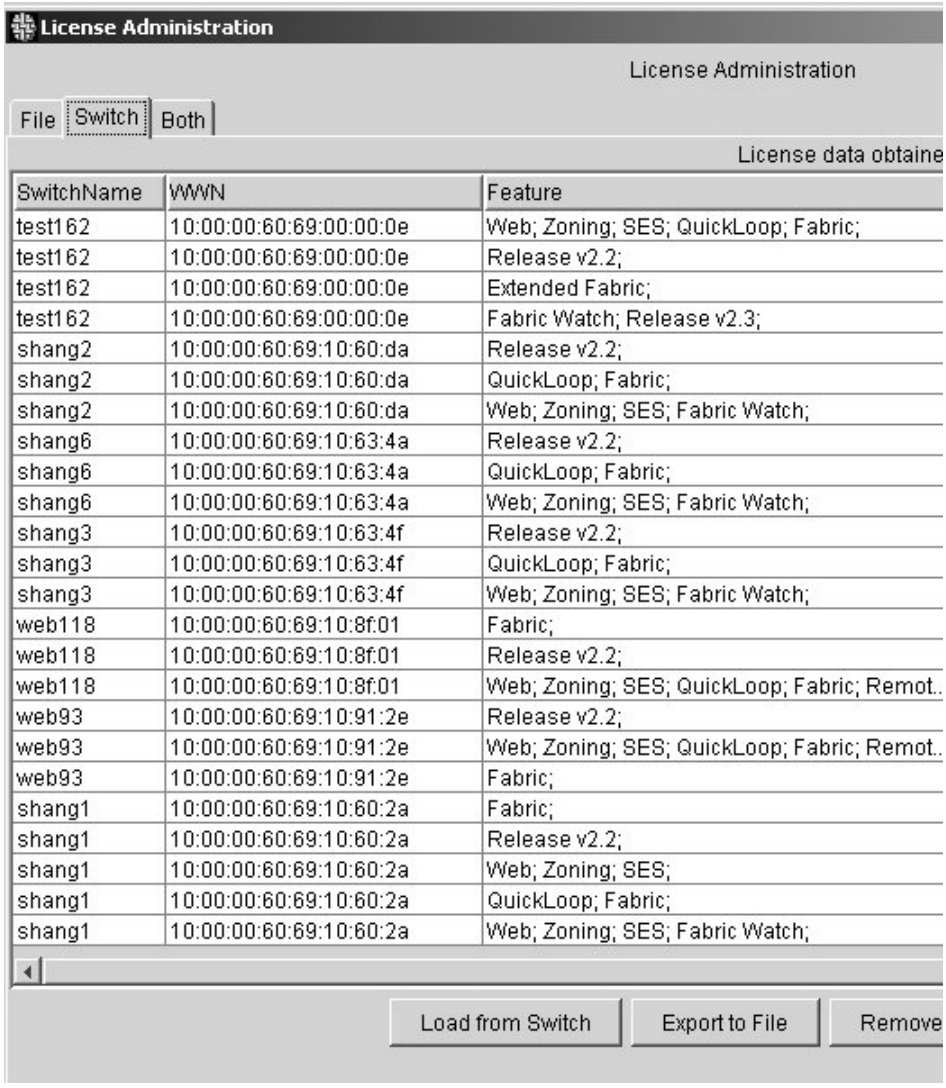


Figure 30: License Admin dialog box of the License menu

Fabric Merge

Use the Fabric Merge option of the Tools menu to facilitate the process of merging two fabrics.

Performing a Fabric Merge

To choose two fabrics as merge candidates:

1. Choose **Tools > Fabric Merge**. The **Fabric Merge Check** dialog box displays, as shown in Figure 31

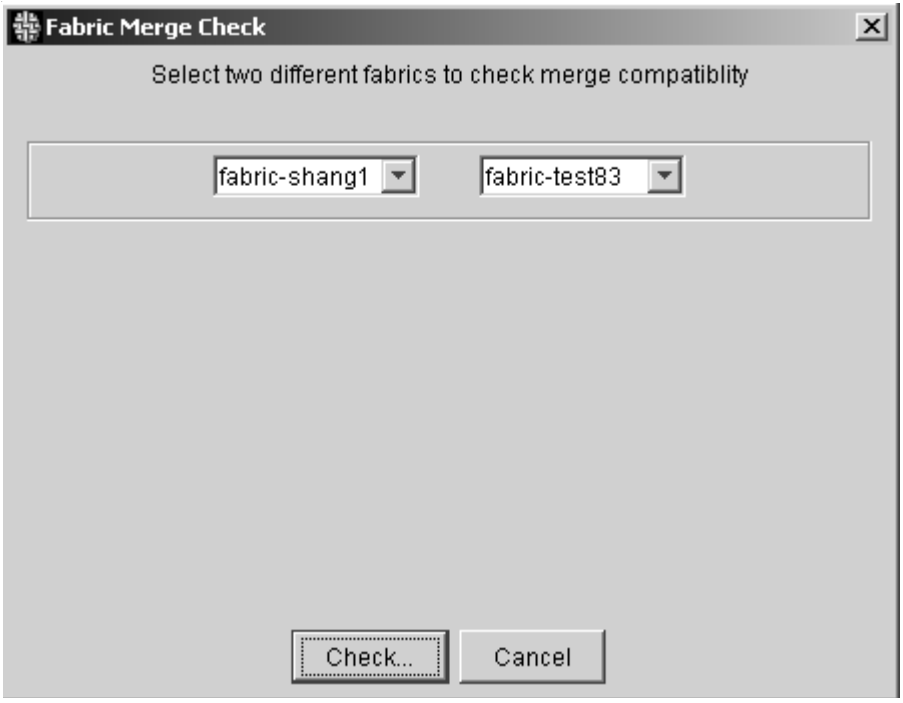


Figure 31: Fabric Merge Check dialog box

2. Choose two fabrics to merge from the drop-down lists.
3. Click **Check**. Testing is initiated to compare configurations that are currently active. Results are displayed in the **Merge Check Results** dialog box, as shown in Figure 32.

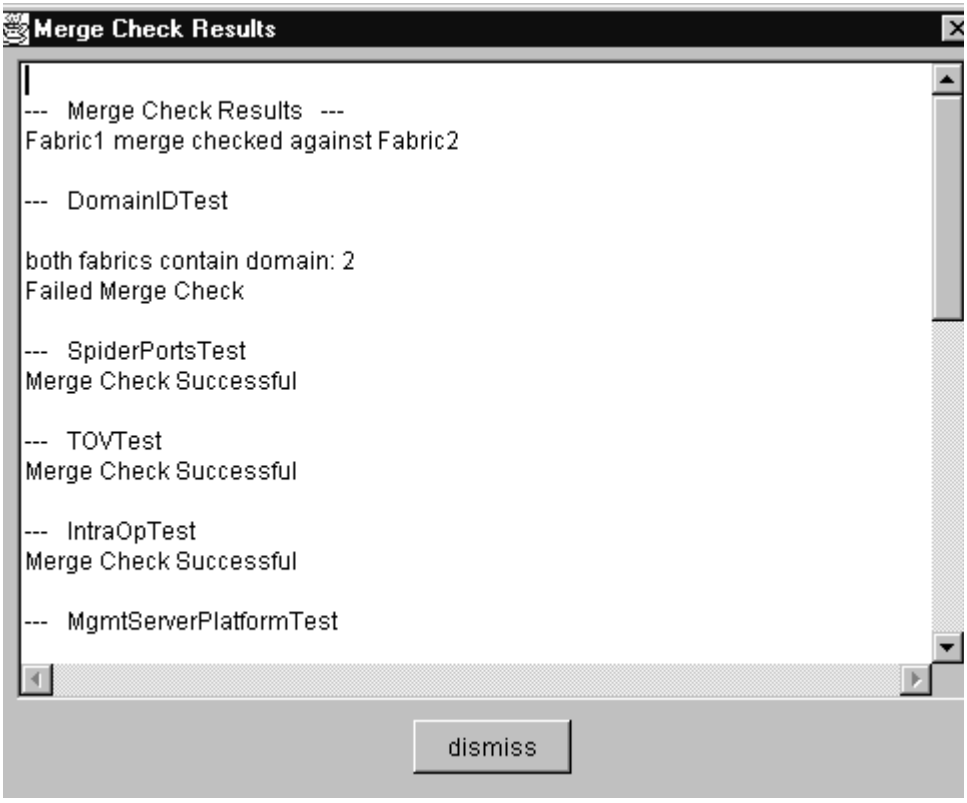


Figure 32: Merge Check Results dialog box

If incompatibilities are found between fabrics, the **Zone Merge** dialog box displays, as shown in Figure 33.

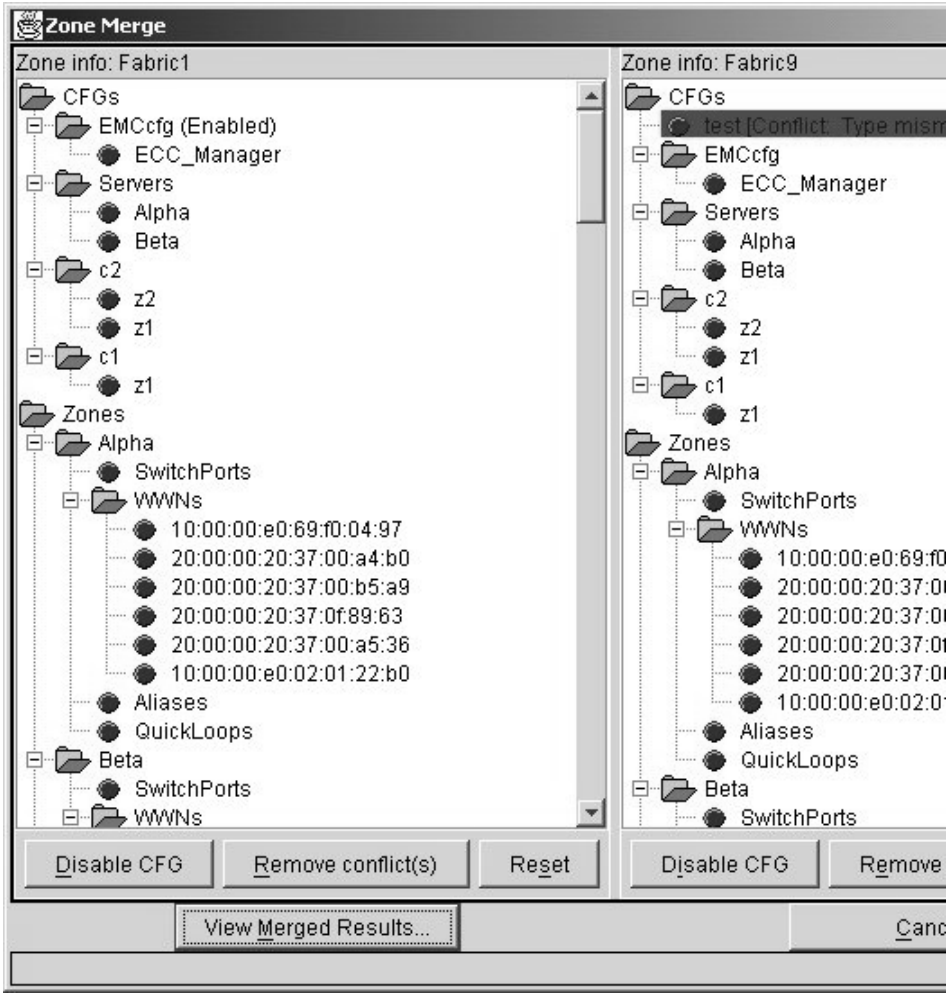


Figure 33: Zone Merge dialog box

4. Click **Options** to remove conflicts.

Note: For more information about merging fabrics, see "Validate Merging of Two Fabrics" on page 148.

Help Menu

8

This chapter provides the following information:

- Help on page 112
- Context Sensitive Help on page 114
- Status Legend on page 116

The Help menu is shown in Figure 34.

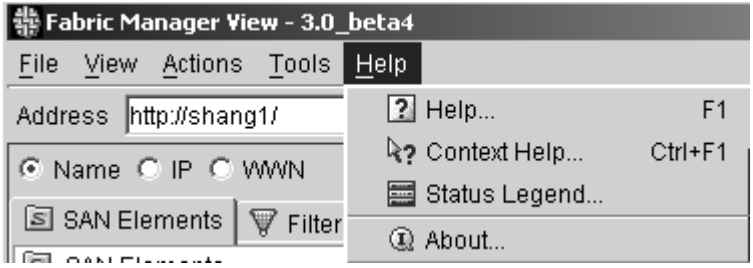


Figure 34: Help menu

Help

Use the Help option to view selected information about Fabric Manager features.

Using Help

To use Help:

1. Choose **Help > Help.** The **Help** dialog box displays, as shown in Figure 35.

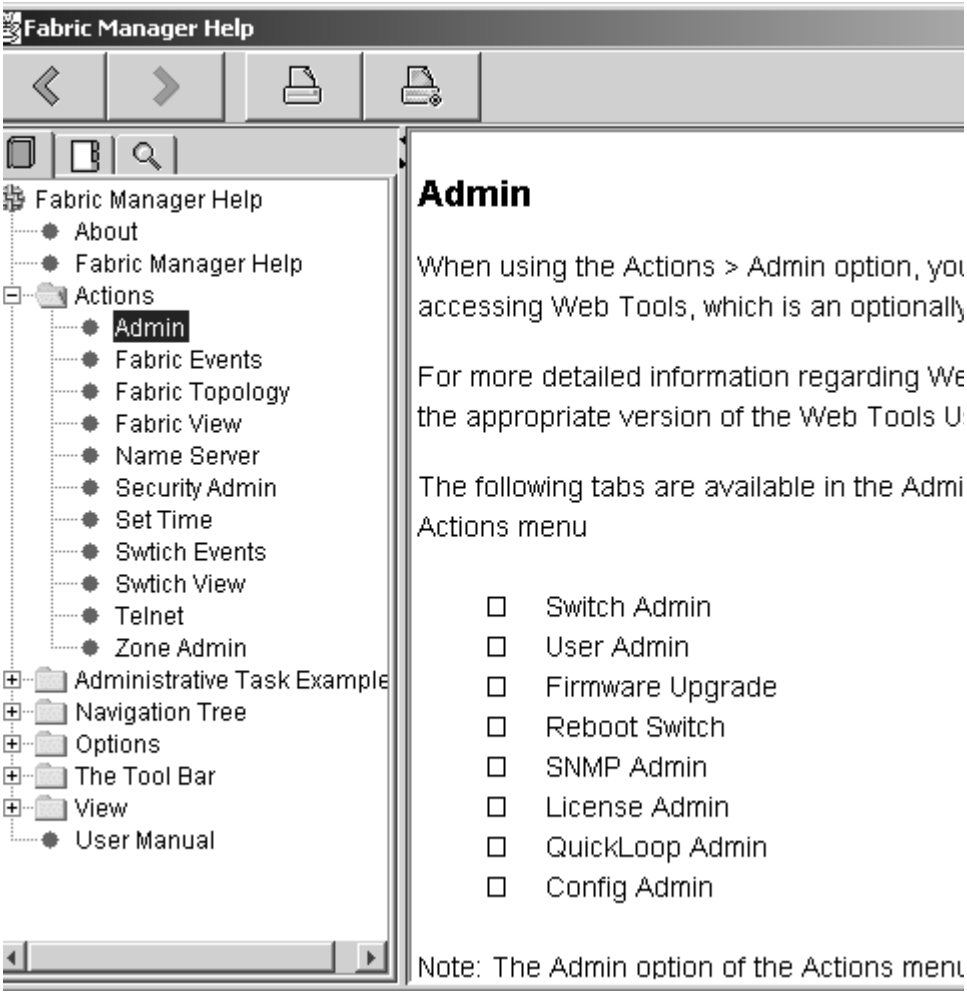


Figure 35: Sample Help dialog box of the Help menu

2. Choose a folder from the navigation tree in the left column. Information displays in the right-hand dialog box.
3. Open a folder and choose a file to view sub-topics.

Context Sensitive Help

Use the Context Help option to view context-sensitive information about Fabric Manager features.

Using Context Sensitive Help

To use Context Sensitive Help:

1. Click **Context Sensitive Help**. A question mark displays on screen.
2. Use your mouse to click on an object of interest on screen. A **Help** dialog box displays, as shown in Figure 36.

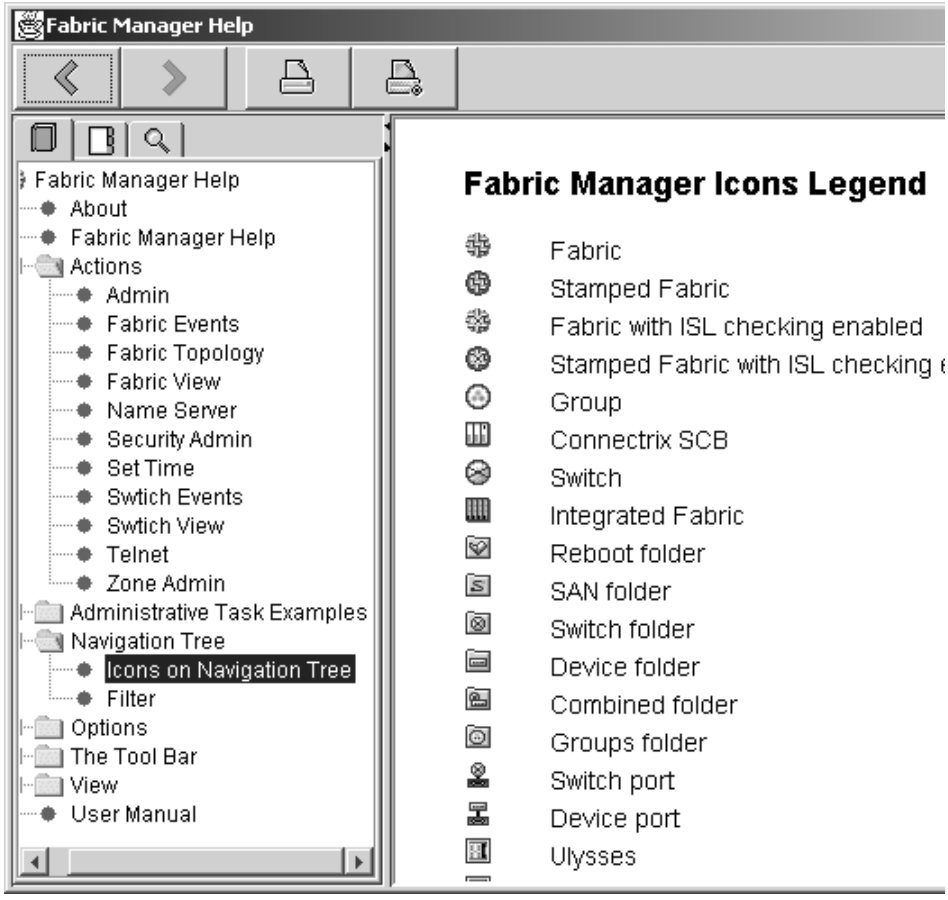


Figure 36: Sample Context Sensitive Help dialog box

Status Legend

The Status Legend defines the meaning of colors visible in the background of the switch icons. Each color indicates a different operational state:

- Blue—Unknown
- Green—Healthy
- Yellow—Marginal (mix of good and faulty readings)
- Red—Down (more than two faulty readings)
- Gray—Unmonitored
  - — If the status of the switch is Unmonitored, the status does not change during that Fabric Manager session.

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

Note: For all statuses that are based on errors per time interval, any errors cause the status to show faulty until the entire sample interval has passed.

The Status Legend is shown in Figure 37.

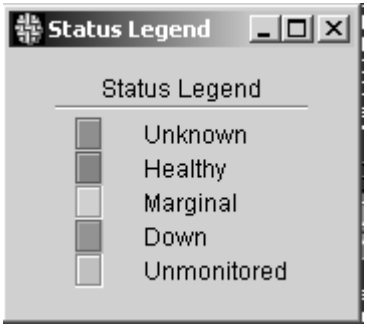


Figure 37: Status Legend

Using the Status Legend

A sample of an individual switch icon is shown in Figure 38.

Figure 38: Individual switch

The background color of the switch indicates that the status of the switch is down.

Tool Bar

9

This chapter provides information regarding options that are available through the Tool Bar of the Fabric View. The following icons and dialog boxes are available through the Fabric Manager Tool Bar:

- Address Dialog Box on page 120
- Fabric Login Icon on page 121
- Open FM Log on page 124
- Print Table Icon on page 126
- Download Firmware Icon on page 127
- Sequenced Reboot Icon on page 130
- Context Sensitive Help Icon on page 132
- Help on page 134

The Tool Bar is shown in Figure 39.

Figure 39: Tool Bar in Fabric view

Address Dialog Box

Use the Address dialog box to enter the IP address, name, or WWN of the switch that you want to manage or monitor. Once the switch information has been entered, the address can be chosen automatically from the drop-down list. The Address dialog box is available through the Fabric View. For more information, see “Accessing Fabric Manager View” on page 42.

The Address dialog box is shown in Figure 40.

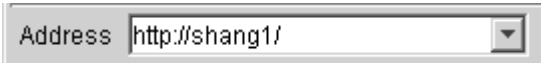


Figure 40: Address dialog box in Fabric view

Fabric Login Icon

Use the Fabric Login icon to access the Fabric Login dialog box, which allows you to choose a group of switches to log in to. The Fabric Login icon is available through the Fabric View. For more information, see “Accessing Fabric Manager View” on page 42.

The Login Setup dialog box is shown in Figure 41.

Figure 41: Fabric Login icon

When the Fabric Login Setup icon is selected, the Login Setup dialog box displays.

Login Setup Dialog Box

Use the Login Setup dialog box to choose a group of switches to log in to simultaneously. The Login Setup dialog box is shown in Figure 42.

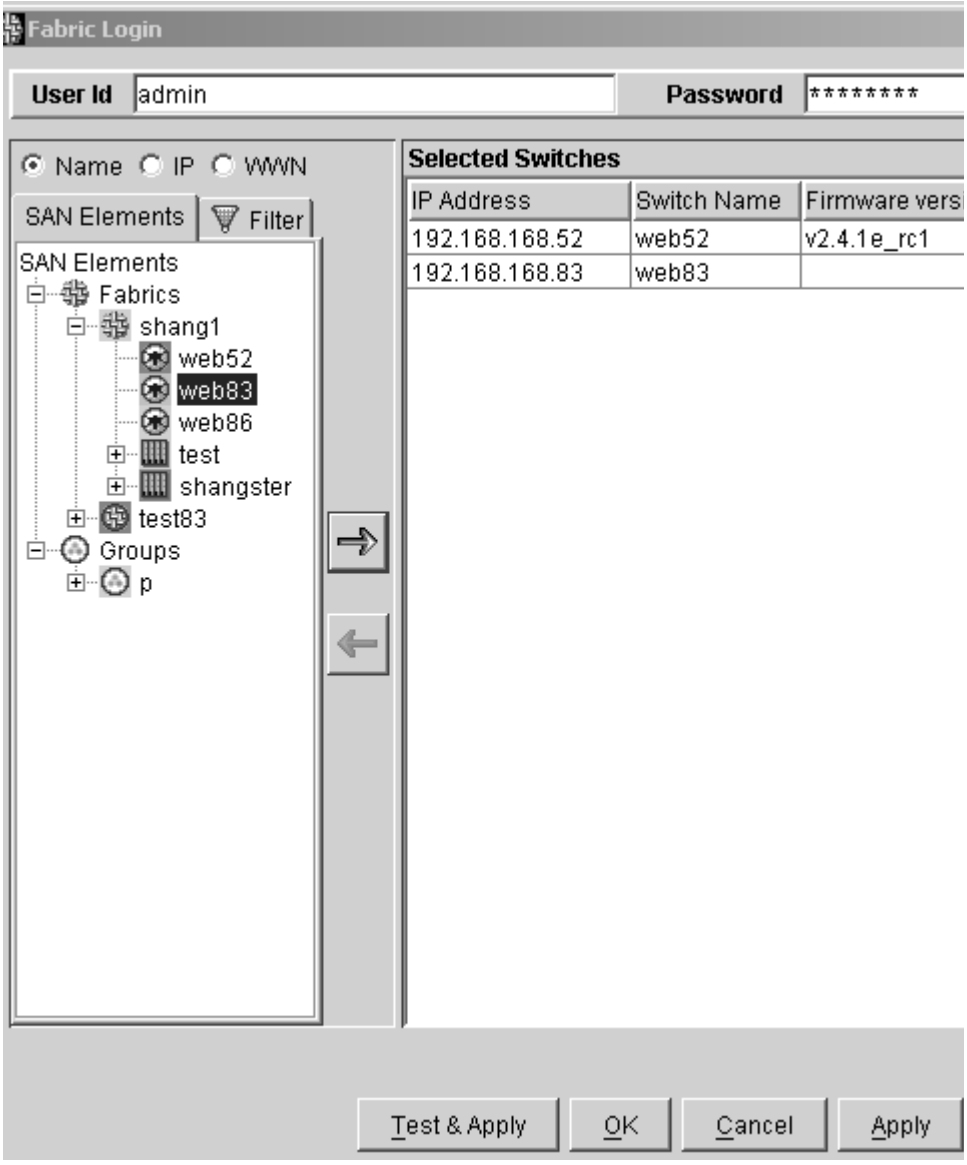


Figure 42: Login Setup dialog box

Logging into Multiple Switches

To log in to multiple switches simultaneously:

1. Launch the **Login Setup** dialog box through one of the following options:
   - Click **Multiple Switches Login Setup**, as shown in Figure 41.
   - Click **Login Setup** from the **Firmware Download** dialog box, as shown in Figure 47.
   - Click **Login Setup** from the **Sequenced Reboot** dialog box, as shown in Figure 49.
2. Highlight switches or groups of switches to be selected. Use mouse clicks in combination with **Shift/Control** to highlight multiple switches.
3. Click **Add/Delete** arrows in the middle column to choose the switches. The selected switches are applied in a table with all their details.
4. Enter the User Name and Password that apply to the switches you selected.
5. Click **Test and Apply** to check your login and apply the login.
   or
   Click **Apply** to login to the selected switches.

Open FM Log

Use the FM Log icon to view events occurring within the fabric.

The FM Log icon is shown in Figure 43.

Figure 43: Open FM Log icon

Fabric Manager Log Dialog Box

The Fabric Manager Log dialog box is shown in Figure 44.

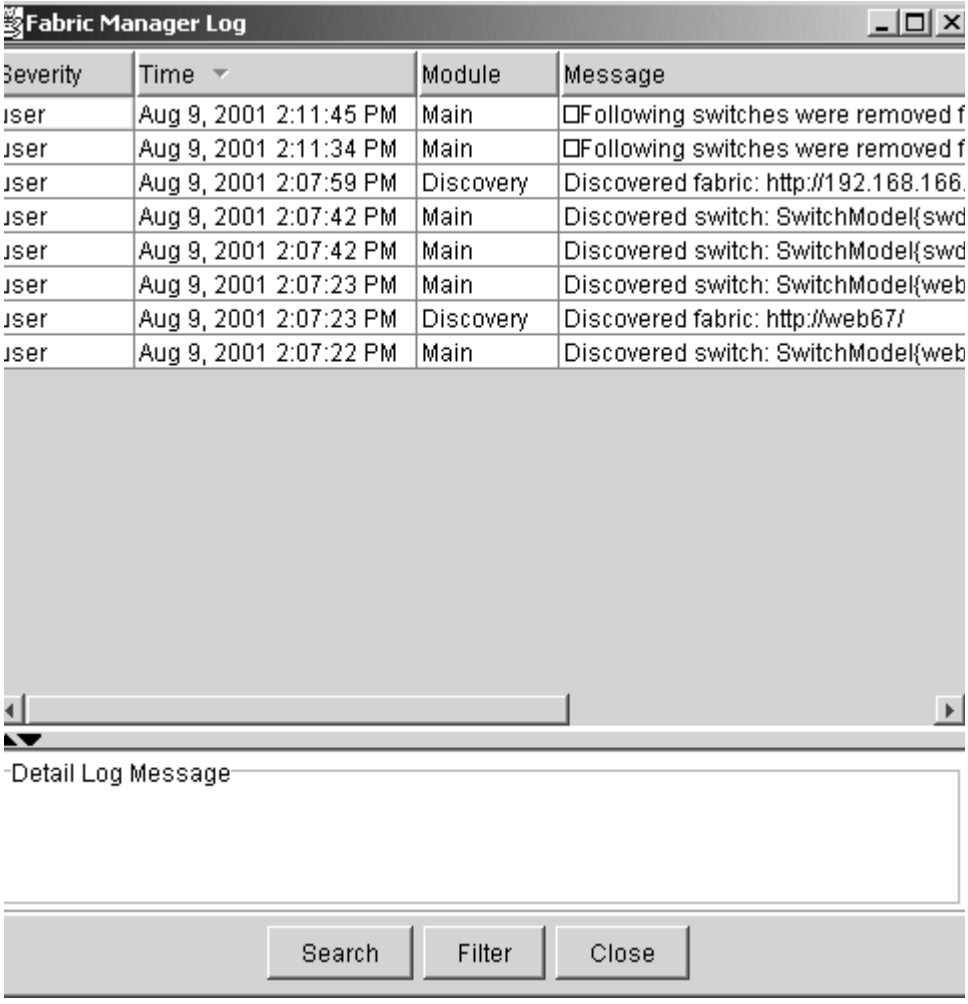


Figure 44: FM Log dialog box

Print Table Icon

Use the Print Table Icon to print table reports for review. The Print Table Icon is available through the Fabric View.

The Print Table icon is shown in Figure 45.

Figure 45: Print Table icon

Download Firmware Icon

Use the Download Firmware icon to access the Download Firmware dialog box, and choose multiple switches to be upgraded simultaneously. The Download Firmware Icon is available through the Fabric View.

The Download Firmware Icon is shown in Figure 46.

Figure 46: Download Firmware icon

Download Firmware Dialog Box

Use the Download Firmware dialog box to upgrade the firmware of multiple switches simultaneously. The Download Firmware dialog box is shown in Figure 47.

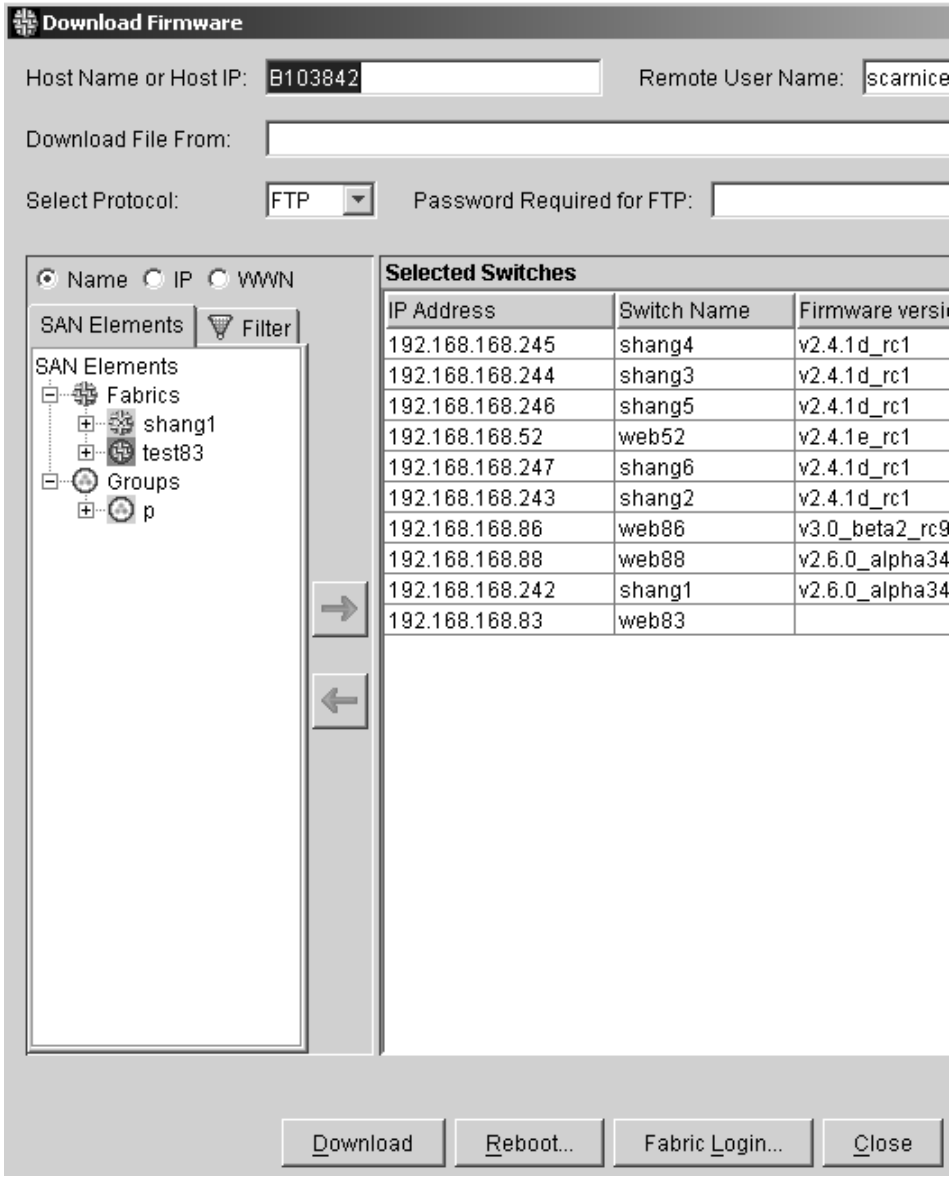


Figure 47: Download Firmware dialog box

Downloading Firmware to Multiple Switches

Use the Download Firmware dialog box to upgrade the firmware to multiple switches:

1. Click **Download Firmware**, as discussed in "Open FM Log" on page 124.
2. Highlight switches or groups of switches to be selected for firmware upgrade. Use mouse clicks in combination with **Shift/Control** to highlight multiple switches.
3. Click **Add/Delete** arrows in the middle column to choose the switches or drag and drop from the navigation dialog box to the table.

   The selected switches are applied in a table with all their details.
4. Enter the Host Name or Host IP address.
5. Enter the Remote User Name.
6. Use **Browse** to choose a firmware file from the local host, or if the firmware is located on the remote host, then type the full path to the firmware on the remote host.
7. Click download protocol (**RSHD** or **FTP**).

Note: If FTP is the chosen protocol, enter FTP password.

---

8. Click **Download** to begin firmware download.

Sequenced Reboot Icon

The Sequenced Reboot icon is shown in Figure 48.

Figure 48: Sequenced Reboot icon

Sequenced Reboot Dialog Box

Use the Sequenced Reboot dialog box to configure switches to reboot in a specified order. This prevents unexpected lapses in fabric availability. The Sequenced Reboot dialog box is shown in Figure 49.

Rebooting Switches

To reboot switches without creating a Reboot Group:

1. Choose **Tools > Reboot**.
2. Click **Sequence Reboot**. The **Sequence Reboot** dialog box displays, as shown in Figure 49.

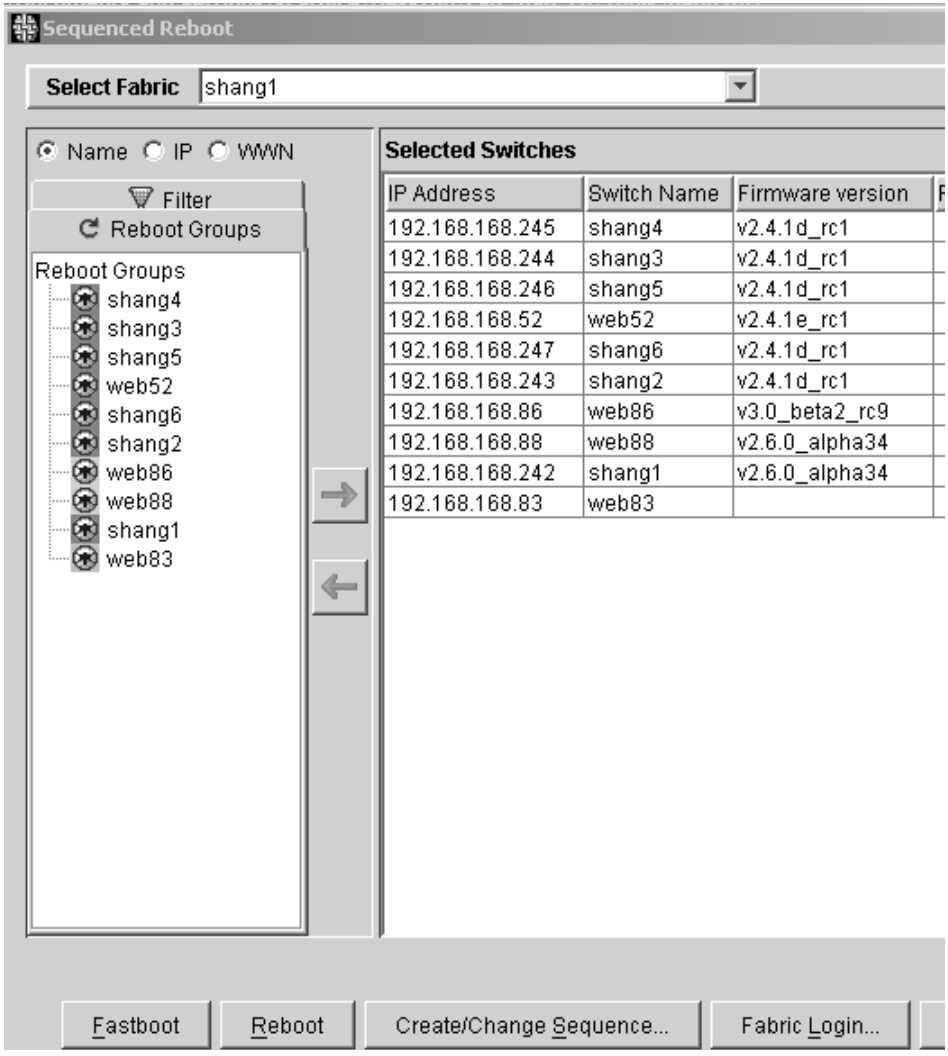


Figure 49: Sequenced Reboot dialog box

3. Choose the switches to be rebooted from the navigation tree. Move switches to the right-hand table by using the right-arrow, or by dragging and dropping. Use **Shift/Click** to choose multiple switches.
4. Click **Fastboot** to reboot selected switches without performing a POST test.
   or
   Click **Reboot** to reboot selected switches with POST test.

Context Sensitive Help Icon

Use the Context Sensitive Help icon to access help on the Fabric Manager screen. The Context Sensitive Help icon is shown in Figure 50.

Figure 50: Context Sensitive Help icon

Using Context Sensitive Help

To use Context Sensitive Help:

1. Click **Context Sensitive Help**. A question mark displays on screen.
2. Use your mouse to click on an object of interest on screen. A dialog box displays, as shown in Figure 51.

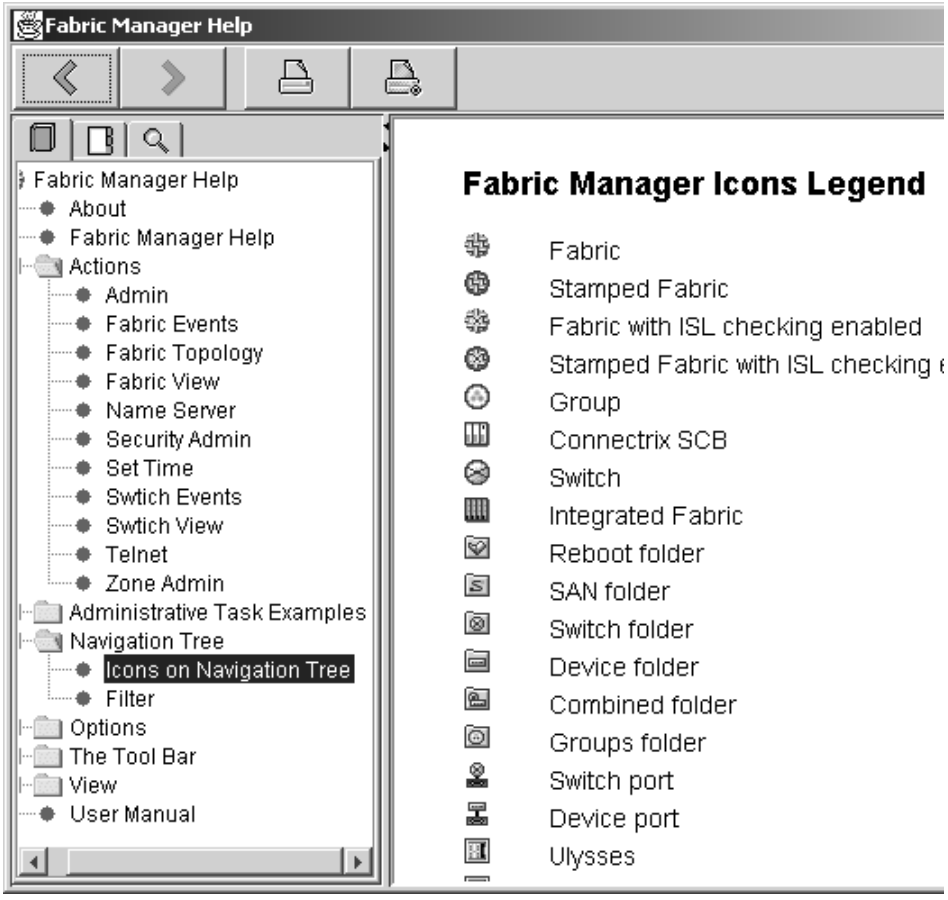


Figure 51: Sample Context Sensitive Help dialog box

Help

Use the Help icon to view the following areas:

- Help
- Context Help
- Status Legend
- About

The Help icon is shown in Figure 52.

Figure 52: Help icon

Switch View

10

This chapter briefly describes the options and interfaces available through the Switch View, which consist of the following:

- Port icons on page 137
- Status on page 138
- Events on page 138
- Fabric Watch on page 138
- Fan on page 138
- Admin on page 138
- Telnet on page 138
- Performance Monitor on page 138
- Beacon on page 139
- Temp on page 139
- Info on page 139

Note: The options available in the Switch View vary depending on the version of Web Tools that is installed on the individual switch.

Web Tools

When using the Switch View, you are actually accessing Web Tools.

Note: For more information on Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*.

Access

To access Web Tools:

1. Click **Fabric Manager**. The **Switch View** displays as part of the main **Fabric View**.
2. Click an individual switch. **Web Tools** launches and the **Switch View** displays, as shown in Figure 53.

Capabilities

The Switch View, or Web Tools, provides a graphical interface that allows the administrator to monitor individual switches and ports from a standard workstation. The Switch View displays as shown in Figure 53.

Figure 53: Switch view

Table 13 lists the options available in the Switch View:

Table 13: Available Options on the Switch View

Option	Description
Port icons	The letters in the Port icon indicate the SFP (Small Form Factor Pluggable) type, as follows: blank—No SFP present SW—Short wave SFP LW—Long wave SFP CU—Copper SFP SWID—Short wave serial ID SFP LWID—Long wave serial ID SFP CUID—Copper serial ID SFP 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 top 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). 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	a. Removable power assemblies are updated to show presence/absence and status of each: a. Green—Power supply present and operational. a. Red X—Power supply present but not operational. a. Cover plate—Power supply absent or not fully plugged in.

Table 13: Available Options on the Switch View (Continued)

Status	Click to view the switch's health status.
Events	Click to access Switch Events View.
Telnet	Click to launch a Telnet session.
Fabric Watch (optional software)	Click to access Fabric Watch, if a license is installed.
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.
Performance Monitor	Click to display the Performance Monitor where you can monitor switch performance.

Table 13: Available Options on the Switch View (Continued)

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 thermal 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
Info 	Click to display the switch information.

Note: For more information on Web Tools, refer to the appropriate version of the *HP StorageWorks Web Tools Version 3.0.x/4.0.x User Guide*.

Administrative Task Examples

11

This chapter provides examples of the following administrative tasks that can be performed:

- Create a Logical Group on page 142
- Share a Group with Another Host on page 143
- Filter a Fabric on page 144
- Share a Group with Another Host on page 143
- Save a Baseline Configuration on page 145
- Download and Apply a Baseline Configuration on page 146
- Validate Merging of Two Fabrics on page 148
- Monitor ISLs on page 149
- Create a Reboot Group on page 150
- Set up a Sequenced Reboot on page 151

Create a Logical Group

To create a group of controllable SAN objects:

1. Choose **File > Group > Create**. The **Create Group** dialog box displays.
2. Highlight the word **Groups** (that you want to create a new group in) from the navigation tree.
3. Click **Create** from the bottom of the navigation tree dialog box. The **Create Groups** dialog box displays.
4. Type in a name for the group and press **OK**. The name of your group displays in the navigation tree.
5. Highlight the name of your group from the navigation tree by clicking on it.
6. Choose switches from the left navigation tree to be added to the Group. To choose multiple switches, use **Shift/Click**.
7. Add selected switches to your group by clicking on the right-arrow button, or by dragging and dropping selections from the navigation tree to the Group.

Share a Group with Another Host

To share a logical group with another host:

1. Choose **File > Groups**.
2. Click **Export**.
3. Use Browse to choose a file to Export a Group to.
4. Type a name for your group file.
5. Highlight the name of the group(s) to be exported from the navigation tree.
6. Add the group to be exported by clicking on the arrow button, or by dragging and dropping selections from the navigation tree to the table.
7. Click **OK**.
8. Go to a host on a separate machine.
9. Choose **File > Groups**.
10. Click **Import**.
11. Browse to choose the file you previously exported to.

Filter a Fabric

To filter a fabric, using specific parameters:

1. Click **Filter** tab from the **SAN Elements Panel**.
2. Choose the filter parameters from the drop-down list.
3. Type in the IP address, Name, or other search parameter in the dialog box beside the drop-down list.
4. Press the **Enter** key. Any switches that match the criteria are displayed in the panel below the text box.

Save a Baseline Configuration

To create a baseline configuration:

1. Choose **Tools > Config**.
2. Click **Save Baseline**.
3. Choose a template as a base for your configuration or browse to choose an XML template file.
4. Click **Next**. The **Pick a Baseline Target Switch** dialog box displays.
5. Highlight a switch to use as a baseline configuration from the navigation tree.

Note: You must highlight one switch only, not a fabric.

---

6. Choose the highlighted switch by clicking on the left-arrow button, or by dragging and dropping selections from the navigation tree to the table.
7. Click **Login** and log in to the switch (if you have not previously done so).
8. Set up File Transfer properties if you have not previously done so. The **Base Configuration** dialog box displays.

Note: You can set up File Transfer properties anytime by selecting File > Options and selecting the **File Transfer** tab.

---

9. Check the configuration properties that you would like to save to your template from the Base Configuration dialog box.
10. Click **Save**. The **Save Base** dialog box displays.
11. Enter a file name for your configuration template.

    It is recommended that you name your file so that you can easily recognize selected configuration parameters. Example:

    ```
    SNMP_Baseline.txt
    ```

12. Click **Save**.

Download and Apply a Baseline Configuration

A baseline configuration can be downloaded from a file or switch.

Download and Apply a Baseline Configuration from a File

To download and apply a baseline configuration from a switch:

1. Create a Reboot Group if you intend to apply a Baseline Configuration to an entire fabric. This is an optional step, however, it is recommended to maintain the stability of a fabric.
2. Choose **Tools > Config**.
3. Click **Compare/Download from File**.
4. Browse to choose a baseline configuration file and click **Open**. The **Target Switches** dialog box displays.
5. Highlight switches that you want to compare to the baseline configuration from the navigation tree.
6. Choose the highlighted switch by clicking on the left-arrow button, or by dragging and dropping selections from the navigation tree to the table.
7. Click **Login** and log in to the switch (if you have not previously done so).
8. Set up File Transfer properties, if you are prompted to do so.

Note: You can set up File Transfer properties anytime by selecting File > Options and selecting the **File Transfer** tab.

---

9. Click **OK**. The **Configure Compare/Download** dialog box displays.
10. Click **Apply** to apply baseline configuration to switches.
    or
    Click **Print a Report** to print a report of switch configuration comparisons.

Download and Apply Baseline Configuration from a Switch

To download and apply a baseline configuration from a switch:

1. Create a Reboot Group if you intend to apply a Baseline Configuration to an entire fabric. This is an optional step, however, it is recommended to maintain the stability of a fabric as switches are rebooted.

2. Choose **Tools** > **Config**.
3. Click **Compare/Download from Switch**.
4. Highlight a switch from the navigation tree to use as a baseline configuration.

Note: You must choose one switch only, not a whole fabric.

---

5. Highlight switches that you want to compare to the baseline configuration from the navigation tree.
6. Choose the highlighted switch by clicking on the left-arrow button, or by dragging and dropping selections from the navigation tree to the table.
7. Click **Login** and log in to the switch (if you have not previously done so).
8. Set up File Transfer properties, if you are prompted to do so.

Note: You can set up File Transfer properties anytime by selecting File > Options and selecting the **File Transfer** tab.

---

9. Click **OK**. The **Configure Compare/Download** dialog box displays.
10. Click **Apply** to apply baseline configuration to switches.
    or
    Click **Print a Report** to print a report of switch configuration comparisons.

Validate Merging of Two Fabrics

To validate the merging of two fabrics:

1. Choose **File > Options**.
2. Click **File Transfer** tab.
3. Click **Tools > Fabric Merge**.
4. Choose two fabrics to be merge-tested by using the drop-down lists.
5. Click **Check** at the bottom of the dialog box. The **Login Setup** dialog box displays, if you have not already logged into the switch. Enter the User Name and Password at the top of the dialog box.
6. Highlight switches from the right-hand table to be tested. To choose multiple switches, use **Shift/Click**.
7. Add selected switches to be tested by clicking on the right-arrow button, or by dragging and dropping selections from the table to the navigation tree.
8. Click **Test**. Check the status of your test in the **Status** column of the table.

Monitor ISLs

To monitor ISLs and Fabric Configurations:

1. Choose **File > Options**. The **Options** dialog box displays with three tab choices.
2. Click **ISL Status** tab.
3. Choose the status parameters to be propagated in the Fabric Events.
4. Click **OK**.
5. Choose **Actions > ISL > ISL Checking** to turn on ISL checking. A checkmark displays, showing that ISL checking is active.
6. Choose **Actions > Restamp** any time you want to restamp the fabric topology.

Note: There is a ten second time spacing in stamping. When ISL checking is turned on, the stamp is set to the results of the last poll, which is at most ten seconds behind.

---

7. Choose **Actions > Events** to view changes to fabric topology.

Create a Reboot Group

To create a reboot group:

1. Choose **Tools > Reboot**.
2. Click **Create Reboot Sequence**. The **Create or Change Reboot Groups** dialog box displays.
3. Choose a fabric from the drop-down list at the top of the dialog box.
4. Click **Create** from the bottom of the navigation tree. The **Create Reboot Group** dialog box displays.
5. Type in a name for the reboot group.
6. Enter **Fabric Stabilization** time-out information and choose the action to take if time-out occurs.
7. Enter delay time after stabilization.
8. Enter Fabric Stabilization information and press **OK**. The name of your group displays in the navigation tree.
9. Click **OK**.
10. Choose switches from the table to be added to the reboot group. Use **shift/click** to choose multiple switches.
11. Click the left arrow, or use drag and drop to move switches from the table to the reboot group.

Note: Delete switches or reboot groups by pressing the delete button; this moves the related switches to the table of unassigned switches.

Two reboot groups can be merged by dragging one group and dropping it on another group.

The switch reboot sequence can be changed by selecting one or more groups and pressing the up/down arrow button to move the selected groups up/down in the order of reboot.

12. Click **Apply** or **OK** to save reboot group. The **Sequenced Reboot** dialog box displays. For instructions on proceeding with reboot, see "Set up a Sequenced Reboot" on page 151.

Set up a Sequenced Reboot

To set up a sequenced reboot:

1. Choose **Tools > Reboot > Sequence Reboot**. The **Sequenced Reboot** dialog box displays.
2. Choose a fabric from the drop-down list at the top of the dialog box.
3. Highlight the name of your group from the navigation tree by clicking on it.
4. Choose switches from the right-hand table to be added to the reboot group.
5. Click **Login Setup** (if you have not previously logged into the switches).
6. Click **OK** to proceed when the confirmation dialog box displays.
7. Click **Reboot** to administer sequenced reboot.
8. Login to switch if you are prompted.
9. Press **Abort** to abort the sequenced reboot at any time. If you have set up a delay on the reboot group, a delay timer displays. Press **Play-Pause-Skip** on the delay timer at runtime.
10. View message at the end of sequenced reboot. A message displays the success or failure of the operation.

glossary

This glossary defines terms used in this guide or related to this product and is not a comprehensive glossary of computer terms.

16-port card
The Fibre Channel port card provided with the StorageWorks Core switch. Contains 16 Fibre Channel ports and the corresponding LEDs indicating port status and speed.

See also port card.

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

Access Control List
Enables an organization to bind a specific WWN to a specific switch port or set of ports, preventing a port in another physical location from assuming the identity of a real WWN. May also refer to a list of the Read/Write access of a particular community string.

See also device connection controls.

Account Level Switches
Refers to switches that have four login accounts into the operating system (in descending order): root, factory, admin, and user.

See also root account, factory account, admin account, and user account.

Address Identifier
A 24-bit or 8-bit value used to identify the source or destination of a frame.

Admin Account
A login account intended for use by the customer to control switch operation.

See also account level switches.

AL_PA
Arbitrated Loop Physical Address. A unique 8-bit value assigned during loop initialization to a port in an arbitrated loop.

Alias
An alternate name for an element or group of elements in the fabric. Aliases can be used to simplify the entry of port numbers and WWNs when creating zones.

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.

See also alias.

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
A fabric software facility that supports multicast group management.

ANSI
American National Standards Institute. The 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 or 200 MBps Fibre Channel transport structured as a loop. Can support up to 126 devices and one fabric attachment.

See also topology.

Arbitrating State
The state in which a port has become the loop master. This state is only available from the Open state.

Area Number
A number assigned to each potential port location in the StorageWorks Core switch. Used to distinguish StorageWorks Core switch ports that have the same port number but are on different port Blades.

ASIC
Application Specific Integrated Circuit.

ATM
Asynchronous Transfer Mode. A transport used 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.

Auto-negotiate Speed
Process that allows two devices at either end of a link segment to negotiate common features, speed (e.g., 1 or 2 Gbps) and functions.

Autosense
Process during which a network device automatically senses the speed of another device.

AW_TOV
Arbitration Wait Time-out Value. The minimum time an arbitrating L_Port waits for a response before beginning loop initialization.

Backup FCS Switch
Backup fabric configuration server switch. The switch or switches assigned as backup in case the primary FCS switch fails.

See also FCS switch, primary FCS switch.

Bandwidth
The total transmission capacity of a cable, link, or system. Usually measured in bps (bits per second). May also refer to the range of transmission frequencies available to a network.

See also throughput.

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 the number of receive buffers available.

See also Buffer-to-buffer Flow Control, EE_Credit.

Beacon
When all the port LEDs on a switch are set to flash from one side of the switch to the other, to enable identification of an individual switch in a large fabric. A switch can be set to beacon by telnet command or through Web Tools.

Beaconing
The state of the switches LEDs when the switch is set to Beacon.

See also Beacon.

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. The rate at which bits are expected to be received in error. Expressed as the ratio of error bits to total bits transmitted.

See also error.

Bit Synchronization
See BER.

Blade
See 16-port card.

Blind-mate Connector
A two-way connector used in some switches to provide a connection between the motherboard and the power supply.

Block
As applies to Fibre Channel, upper-level application data that is transferred in a single sequence.

Blower Assembly
A fan that prevents a switch (or individual elements within a switch) from overheating.

Boot Flash
Flash memory that stores the boot code and boot parameters. The processor executes its first instructions from boot flash. Data is cached in RAM.

Boot Monitor
Code used to initialize the CP (control processor) environment after powering on. Identifies the amount of memory available and how to access it, and retrieves information about system buses.

Broadcast
The transmission of data from a single source to all devices in the fabric, regardless of zoning.

See also multicast, unicast.

Buffer-to-buffer Flow Control
Management of the frame transmission rate in either a point-to-point topology or in an arbitrated loop.

See also BB_Credit.

Cascade
Two or more interconnected Fibre Channel switches. StorageWorks 1 Gb SAN switches (running Fabric OS V2) and later can be cascaded up to 239 switches, with a recommended maximum of seven interswitch links (no path longer than eight switches).

See also fabric, ISL.

Chassis
The metal frame in which the switch and switch components are mounted.

Circuit
An established communication path between two ports. Consists of two virtual circuits capable of transmitting in opposite directions.

See also link.

Class 1
Service that provides a dedicated connection between two ports (also called connection-oriented service), with notification of delivery or non-delivery.

Class 2
Service that provides multiplex and connectionless frame switching service between two ports, with notification of delivery or non-delivery.

Class 3
Service that provides a connectionless frame switching service between two ports, without notification of delivery or non-delivery of data. This service can also be used to provide a multicast connection between the originator and recipients, with notification of delivery or non-delivery.

Class F
Connectionless service for control traffic between switches, with notification of delivery or non-delivery of data between the E_Ports.

Class of Service
A specified set of delivery characteristics and attributes for frame delivery.

CLI
Command line interface. Interface that depends entirely on the use of commands, such as through telnet or SNMP, and does not involve a Graphic User Interface (GUI).

CLS
Close Primitive Signal. Only in an Arbitrated Loop; sent by an L_Port that is currently communicating on the loop, to close communication to an other L_Port.

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

See also SNMP.

Compact Flash
Flash memory that stores the run-time operating system and is used like hard disk storage. Not visible within the processor's memory space. Data is stored in file system format.

Configuration
How a system is set up. May refer to hardware or software.

- Hardware: The number, type, and arrangement of components that make up a system or network.
- Software: The set of parameters that guide switch operation. May include general system parameters, IP address information, domain ID, and other information. Modifiable by any login with administrative privileges.

May also refer to a set of zones.

See also zone configuration.

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.

Control Panel
Refers to the left-side panel of Web Tools, which accesses fabric-wide functions such as Zoning and Events.

Core Switch
A switch whose main task is to interconnect other switches.

See also SAN switch.

CP Card
Control Processor Card. The central processing unit of the StorageWorks Core switch, which contains two CP Card slots to provide redundancy. Provides Ethernet, serial, and modem ports with the corresponding LEDs.

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, EE_Credit.

CT_HDR
Common Transport Header. A header that conforms to the Fibre Channel Common Transport (FC_CT) protocol.

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.

See also fill word, LPSM.

Cut-through
A switching technique that allows the route for a frame to be selected as soon as the 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.

DB-9 connector
A 9-pin version of the RS-232C port interface. May be either the male of female interface.

See also RS-232 port.

dBm
Logarithmic unit of power used in electronics. Indicates signal strength in decibels above the reference level, which is 1 milliwatt for dBm. An increase of 10 dBm or represents a 10-fold increase in power.

DCE port
A data communications equipment port capable of interfacing between a DTE (data terminal equipment) port and a transmission circuit. DTE devices with an RS-232 (or EIA-232) port interface transmit on pin 3, and receive on pin 2.

See also DTE port, RS-232 port.

Defined Zone Configuration
The set of all zone objects defined in the fabric. May include multiple zone configurations.

See also enabled zone configuration, zone configuration.

Device Connection Controls
Enables organizations to bind an individual device port to a set of one or more switch ports. Device ports are specified by a WWN and typically represent HBAs (servers).

See also access control lists.

Device
A disk, a RAID, or an HBA.

Disparity
The relationship of ones and zeros in an encoded character. “Neutral disparity” means an equal number of each, “positive disparity” means a majority of ones, and “negative disparity” means a majority of zeros.

DLS
Dynamic Load Sharing. Dynamic distribution of traffic over available paths. Allows for recomputing of routes when an Fx_Port or E_Port changes status.

Domain ID
As applies to HP StorageWorks switches, a unique number between 1 and 239 that identifies the switch to the fabric and is used in routing frames. Usually automatically assigned by the switch, but can be manually assigned.

DTE port
A data terminal equipment port capable of interfacing to a transmission circuit through a connection to a DCE (data communications equipment) port. DTE devices with an RS-232 (or EIA-232) port interface transmit on pin 3, and receive on pin 2 in a 9-pin connector (reversed in 25-pin connectors).

See also DCE port, RS-232 port.

DWDM
Dense Wavelength Multiplexing. A means to concurrently transmit more than one stream of data through a single fiber by modulating each stream of data onto a different wavelength of light.

E_D_TOV
Error Detect Time-out Value. The minimum amount of time a target waits for a sequence to complete before initiating recovery. Can also be defined as the maximum time allowed for a round-trip transmission before an error condition is declared.

See also R_A_TOV, RR_TOV.

E_Port
Expansion Port. A type of switch port that can be connected to an E_Port on another switch to create an ISL.

See also ISL.

EE_Credit
End-to-end Credit. The number of receive buffers allocated by a recipient port to an originating port. Used by Class 1 and 2 services to manage the exchange of frames across the fabric between source and destination.

See also End-to-end Flow Control, BB_Credit.

EIA Rack
A storage rack that meets the standards set by the Electronics Industry Association.

ELWL
Extra Long Wave Length. Laser light with a periodic length greater than 1300 nm (e.g., 1420 or 1550). ELWL lasers are used to transmit Fibre Channel data over distances greater than 10 km.

Also known as XLWL.

Enabled Zone Configuration
The currently enabled zone configuration. Only one configuration can be enabled at a time.

See also defined zone configuration, zone configuration.

End-to-end Flow Control
Governs flow of class 1 and 2 frames between N_Ports.

See also EE_Credit.

Entry Fabric
Basic HP license that allows one E_Port per switch. Not supported by StorageWorks Core switches.

Error
As applies to Fibre Channel, a missing or corrupted frame, time-out, loss of synchronization, or loss of signal (link errors).

See also loop failure.

ESD
Electrostatic Discharge.

Exchange
The highest level Fibre Channel mechanism used for communication between N_Ports. Composed of one or more related sequences, and can work in either one or both directions.

Extended Fabric
An HP product that runs on Fabric OS and allows creation of a Fibre Channel fabric interconnected over distances of up to 100 kilometers.

Extended Fabric is a means of allowing the implementation and management of SANs over extended distances. This is achieved by adjusting the Buffer-to-Buffer Credits to guaranteed allocation of buffers to specific ports.

F_Port
Fabric Port. A port that is able to transmit under fabric protocol and interface over links. Can be used to connect an N_Port to a switch.

See also FL_Port, Fx_Port.

Fabric
A Fibre Channel network containing two or more interconnected switches in addition to hosts and devices. May also be referred to as a switched fabric.

See also topology, SAN, cascade.

Fabric Access
An HP product that consists of a set of APIs that allow third party applications to interface with Fabric OS.

Fabric Access allows the application to control the fabric directly for functions such as discovery, access (zoning), management, performance, and switch control. Consists of a host-based library that interfaces the application to switches in the fabric over an out-of-band TCP/IP connection or in-band using an IP-capable Host Bus Adapter (HBA).

Fabric Assist
An HP feature that enables private and public hosts to access public targets anywhere on the fabric, provided they are in the same Fabric Assist zone. This feature is available only when both QuickLoop and Zoning are installed on the switch.

Fabric Assist is a means of allowing private hosts to communicate with public targets across a switched fabric. Fabric Assist also allows private hosts to communicate with private targets that are not resident on the same switch across a switched fabric.

See also QuickLoop.

Fabric Configuration Server
One or more designated HP switches that store and manage the configuration parameters for all other switches in the fabric. These switches are designated by WWN, and the list of designated switches is known fabric-wide.

Fabric Manager
An HP product that works in conjunction with Web Tools to provide a graphical user interface for managing switch groups (such as the SAN Switch Integrated/32) as a single unit, instead of as separate switches. Fabric Manager is installed on and run from a computer workstation.

Fabric Name
The unique identifier assigned to a fabric and communicated during login and port discovery.

Fabric OS
The proprietary operating system on HP StorageWorks switches.

Fabric Watch
An HP product that runs on Fabric OS and allows monitoring and configuration of fabric and switch elements.

Allows the SAN manager to monitor key fabric and switch elements, making it easy to quickly identify and escalate potential problems. It monitors each element for out-of-boundary values or counters and provides notification when defined boundaries are exceeded. The SAN manager can configure which elements, such as error, status, and performance counters, are monitored within an HP switch.

See also Fabric Manager.

Factory Account
A login used during manufacturing to initialize and test a switch and is not intended for customer use.

See also account level switches.

Failover
The act that causes control to pass from one redundant unit to another. In the StorageWorks Core switch one may failover from the currently Active Control Processor (CP) to the Standby CP.

FAN
Fabric access notification. Retains the AL_PA and fabric address when loop re-initializes (if the switch supports FAN).

FC-AL-3
The Fibre Channel Arbitrated Loop standard defined by ANSI. Defined on top of the FC-PH standards.

FC-FLA
The Fibre Channel Fabric Loop Attach standard defined by ANSI.

FCIA
Fibre Channel Industry Association. An international organization of Fibre Channel industry professionals. Among other things, provides oversight of ANSI and industry developed standards.

FCP
Fibre Channel Protocol. Mapping of protocols onto the 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 defined by ANSI.

FC-PI
The Fibre Channel Physical Interface standard defined by ANSI.

FC-PLDA
The Fibre Channel Private Loop Direct Attach standard defined by ANSI. Applies to the operation of peripheral devices on a private loop.

FCS switch
Fabric configuration server switch. One or more designated HP switches that store and manage the configuration parameters for all switches in the fabric. FCS switches are designated by WWN, and the list of designated switches is communicated fabric-wide.

See also backup FCS switch, primary FCS switch.

FC-SW-2
The second generation of the Fibre Channel Switch Fabric standard defined by ANSI. Specifies tools and algorithms for the interconnection and initialization of Fibre Channel switches in order to create a multi-switch Fibre Channel fabric.

Fibre Channel Transport
A protocol service that supports communication between Fibre Channel service providers.

See also FSP.

FIFO
First In, First Out. May also refer to a data buffer that follows the first in, first out rule.

Fill Word
An IDLE or ARB ordered set that is transmitted during breaks between data frames to keep the Fibre Channel link active.

Firmware Download
Loading firmware down from a server into a switch.

Firmware
The basic operating system provided with the hardware.

FL_Port
Fabric Loop Port. A port that is able to transmit under fabric protocol and also has arbitrated loop capabilities. Can be used to connect an NL_Port to a switch.

See also F_Port, Fx_Port.

Flash Partition
Two redundant usable areas, called “partitions,” into which firmware can be downloaded in the StorageWorks Core switch.

Flash
Programmable NVRAM memory that maintains its contents.

FLOGI
Fabric Login. The process by which an N_Port determines whether a fabric is present, and if so, exchanges service parameters with it.

See also PLOGI.

Frame
The Fibre Channel structure used to transmit data between ports. Consists of a start-of-frame delimiter, header, any optional headers, the data payload, a cyclic redundancy check (CRC), and an end-of-frame delimiter. There are two types of frames: Link control frames (transmission acknowledgements, etc.) and data frames.

See also Data Word.

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

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 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.

FS_RJT
Fibre Channel Services Reject. An indication that a request for Fibre Channel services could not be processed.

FS
Fibre Channel Service. A service that is defined by Fibre Channel standards and exists at a well-known address. For example, the Simple Name Server is a Fibre Channel service.

See also FSP.

FSPF
Fabric Shortest Path First. HP routing protocol for Fibre Channel switches.

FSP
Fibre Channel Service Protocol. The common protocol for all fabric services, transparent to the fabric type or topology.

See also FS.

Full Fabric
The HP license that allows multiple E_Ports on a switch, making it possible to create multiple ISL links.

Full-duplex
A mode of communication that allows the same port to simultaneously transmit and receive frames.

See also half-duplex.

Fx_Port
A fabric port that can operate as either an F_Port or FL_Port.

See also F_Port, FL_Port.

G_Port
Generic Port. A port that can operate as either an E_Port or F_Port. A port is defined as a G_Port when it is not yet connected or has not yet assumed a specific function in the fabric.

Gateway
Hardware that connects incompatible networks by providing translation for both hardware and software. For example, an ATM gateway can be used to connect a Fibre Channel link to an ATM connection.

GBIC
Gigabit interface converter. A removable serial transceiver module that allows gigabaud physical-level transport for Fibre Channel and gigabit Ethernet. Typically refers only to the SC-form factor transceivers.

See also SFP.

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

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

Half-duplex
A mode of communication that allows a port to either transmit or receive frames at any time, but not simultaneously (with the exception of 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:

- Standard Translative Mode: Allows public devices to communicate with private devices that are directly connected to the fabric.
- QuickLoop Mode: Allows initiator devices to communicate with private or public devices that are not in the same loop.

HBA
Host Bus Adapter. The interface card between a server or workstation bus and the Fibre Channel network.

High Availability
An attribute of equipment that identifies it as being capable of conducting customer operations well in excess of 99% of the time. Typically High Availability is identified by the number of nines in that percentage. “Five Nines” means the equipment is rated as being capable of conducting customer operations 99.999% of the time without failure.

Host
A computer that accesses storage devices over the fabric. May also be referred to as a server.

See also workstation.

Hot Pluggable
A FRU capability that indicates it may be extracted or installed while customer data is otherwise flowing in the chassis.

Hub
A Fibre Channel wiring concentrator that collapses a loop topology into a physical star topology. Nodes are automatically added to the loop when active and removed when inactive.

IBTA
The InfiniBand Trade Association (IBTA). The IBTA is an industry consortium of more than 200 companies working together to develop a new common I/O specification designed to bring greater scalability and performance to server I/O. InfiniBand defines a new channel based, switched-fabric technology for server-to-server and server-to-I/O interconnection that is expected to improve scalability and performance over existing PCI Bus technologies.

Idle
Continuous transmission of an ordered set over a Fibre Channel link when no data is being transmitted, to keep the link active and maintain bit, byte, and word synchronization.

InfiniBand
See IBTA.

Initiator
A server or workstation on a Fibre Channel network that initiates communications with storage devices.

See also Target.

Integrated Fabric
The fabric created by a SAN Switch Integrated/32 and SAN Switch Integrated/64, consisting of six SAN Switch 16-EL switches cabled together and configured to handle traffic as a seamless group.

IOD
In-order Delivery. A parameter that, when set, guarantees that frames are either delivered in order or dropped.

IPA
Initial Process Associator. An identifier associated with a process at an N_Port.

Isolated E_Port
An E_Port that is online but not operational due to overlapping domain IDs or nonidentical parameters (such as E_D_TOVs).

See also E_Port.

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

See also E_Port, cascade, ISL trunking.

ISL Trunking
An HP feature that enables distribution of traffic over the combined bandwidth of up to four ISLs (between adjacent switches), while preserving in-order delivery. A set of trunked ISLs is called a trunking group; each port employed in a trunking group is called a trunking port.

See also Master Port.

IU
Information Unit. A set of information as defined by either upper-level process protocol definition or upper-level protocol mapping.

JBOD
Just a Bunch Of Disks. Indicates a number of disks connected in a single chassis to one or more controllers.

See also RAID.

K28.5
A special 10-bit character used to indicate the beginning of a transmission word that performs Fibre Channel control and signaling functions. The first seven bits of the character are the comma pattern.

See also comma.

Kernel Flash
lash memory that stores the bootable kernel code and is visible within the processor's memory space. Data is stored as raw bits.

Key Pair
In public key cryptography, a pair of keys consisting of an entity's public and private key. The public key can be publicized, but the private key must be kept secret.

L_Port
Loop Port. A node port (NL_Port) or fabric port (FL_Port) that has arbitrated loop capabilities. An L_Port can be in one of two modes:

- Fabric mode: Connected to a port that is not loop capable, and using fabric protocol.
- Loop mode: In an arbitrated loop and using loop protocol. An L_Port in loop mode can also be in participating mode or non-participating mode.

See also Non-participating Mode, Participating Mode.

Latency
The period of time required to transmit a frame, from the time it is sent until it arrives. Together, latency and bandwidth define the speed and capacity of a link or system.

LED
Light Emitting Diode. Used on HP switches to indicate the status of various switch elements.

Link Services
A protocol for link-related actions.

Link
As applies to Fibre Channel, a physical connection between two ports, consisting of both transmit and receive fibers.

See also Circuit.

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

LIS_HOLD_TIME
Loop Initialization Sequence Hold Time. The maximum period of time for a node to forward a loop initialization sequence**.**

LM_TOV
Loop Master Time-out 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.

See also BB_Credit.

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 error.

Loop Initialization
The logical procedure used by an L_Port to discover its environment. Can be used to assign AL_PA addresses, detect loop failure, or reset a node.

Loop_ID
A hex value representing one of the 127 possible AL_PA values in an arbitrated loop.

Looplet
A set of devices connected in a loop to a port that is a member of another loop.

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

LWL
Long Wavelength. A type of fiber optic cabling that is based on 1300-mm lasers and supports link speeds of 1.0625 Gbps. May also refer to the type of GBIC or SFP.

See also SWL.

Master Port
As relates to trunking, the port that determines the routing paths for all traffic flowing through the trunking group. One of the ports in the first ISL in the trunking group is designated as the master port for that group.

See also ISL Trunking.

Media
See transceiver.

MIB
Management Information Base. An SNMP structure to help with device management, providing configuration and device information.

Modem Serial Port
The upper serial port on the CP Card of the StorageWorks Core switch. Can be used to connect the CP Card to a modem with a standard 9-pin modem cable. Consists of a DB-9 connector wired as a RS-232 device, and can be connected by serial cable to a DCE device. A Hayes-compatible modem or Hayes-emulation is required. The device name is ttyS1.

See also DB-9 connector, DCE port, terminal serial port.

Monitoring State
The state in which a port is monitoring the flow of information for data relevant to the port.

Multicast
The transmission of data from a single source to multiple specified N_Ports (as opposed to all the ports on the network).

See also broadcast, unicast.

Multimode
A fiber optic cabling specification that allows up to 500 meters between devices for 1 Gb, or 300 meters between devices for 2 Gb.

N_Port
Node Port. A port on a node that can connect to a Fibre Channel port or to another N_Port in a point-to-point connection.

See also NL_Port, Nx_Port.

NAA
Network Address Authority. An identifier that indicates the format of a network address.

Name Server
Frequently used to indicate Simple Name Server.

See also SNS.

Native Address Identifier
A unique, 64-bit address is assigned to each port, and is referred to as its World-Wide Name (WWN). If a port connects to an arbitrated loop, it will also be assigned a dynamic 8-bit address, referred to as its arbitrated loop physical address, or AL_PA. If it connects to a fabric, it will be assigned a dynamic 24-bit address, referred to as its Native Address Identifier.

Negotiate
See auto-negotiate speed and autosense.

NL_Port
Node Loop Port. A node port that has arbitrated loop capabilities. Used to connect an equipment port to the fabric in a loop configuration through an FL_Port.

See also N_Port, Nx_Port.

Node Name
The unique identifier for a node, communicated during login and port discovery.

Node
A Fibre Channel device that contains an N_Port or NL_Port.

Non-participating Mode
A mode in which an L_Port in a loop is inactive and cannot arbitrate or send frames, but can retransmit any received transmissions. This mode is entered if there are more than 127 devices in a loop and an AL_PA cannot be acquired.

See also L_Port, Participating Mode.

Nx_Port
A 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.

Ordered Set
A transmission word that uses 8B/10B mapping and begins with the K28.5 character. Ordered sets occur outside of frames, and include the following items:

- Frame delimiters: Mark frame boundaries and describe frame contents.
- Primitive signals: Indicate events.
- Primitive sequences: Indicate or initiate port states.

Ordered sets are used to differentiate Fibre Channel control information from data frames and to manage the transport of frames.

Packet
A set of information transmitted across a network.

See also Frame.

Participating Mode
A mode in which an L_Port in a loop has a valid AL_PA and can arbitrate, send frames, and retransmit received transmissions.

See also L_Port, Non-participating Mode.

Path Selection
The selection of a transmission path through the fabric. HP StorageWorks switches use the FSPF protocol.

Performance Monitor
Comprehensive HP tool for monitoring the performance of networked storage resources.

Performance Monitoring
An HP product that provides error and performance information to the administrator and end user for use in storage management.

Phantom Address
An AL_PA value that is assigned to an device that is not physically in the loop.

Also known as phantom AL_PA.

Phantom Device
A device that is not physically in an arbitrated loop, but is logically included through the use of a phantom address.

PLOGI
Port Login. The port-to-port login process by which initiators establish sessions with targets.

See also FLOGI.

Point-to-point
A Fibre Channel topology that employs direct links between each pair of communicating entities.

See also topology.

Port Cage
The metal casing extending out of the optical port on the switch, and in which the SFP can be inserted.

Port Card
A Fibre Channel card that contains optical or copper port interfaces, and acts like a switch module.

See also 16-port card.

Port Module
A collection of ports in a switch.

Port_Name
The unique identifier assigned to a Fibre Channel port. Communicated during login and port discovery.

POST
Power On Self-Test. A series of tests run by a switch after it is turned on.

Primary FCS Switch
Primary fabric configuration server switch. The switch that actively manages the configuration parameters for all switches in the fabric.

See also backup FCS switch, FCS switch.

Private Device
A device that supports arbitrated loop protocol and can interpret 8-bit addresses, but cannot log into the fabric.

Private Loop
An arbitrated loop that does not include a participating FL_Port.

Private NL_Port
An NL_Port that communicates only with other private NL_Ports in the same loop and does not log into the fabric.

Protocol
A defined method and a set of standards for communication.

PSU
Power Supply Unit.

Public Device
A device that supports arbitrated loop protocol, can interpret 8-bit addresses, and can log into the fabric.

Public Loop
An arbitrated loop that includes a participating FL_Port, and may contain both public and private NL_Ports.

Public NL_Port
An NL_Port that logs into the fabric, can function within either a public or a private loop, and can communicate with either private or public NL_Ports.

Quad
A group of four adjacent ports that share a common pool of frame buffers.

QuickLoop
An HP StorageWorks product that makes it possible to allow private devices within loops to communicate with public and private devices across the fabric through the creation of a larger loop.

May also refer to the arbitrated loop created using this software. A QuickLoop can contain a number of devices or looplets; all devices in the same QuickLoop share a single AL_PA space.

A means of allowing private hosts to communicate with private targets across a switched fabric.

The QuickLoop/Fabric Assist feature also allows:

- Private hosts to communicate with public targets across a switched fabric
- Private hosts to communicate with private targets that are not resident on the same switch across a switched fabric

See also Fabric Access, fabric assist, and translative mode.

QuickLoop Zoning
Protects devices from disruption by unrelated devices during critical processes; for example, during a tape backup session.

R_A_TOV
Resource Allocation Time-out Value. The maximum time a frame can be delayed in the fabric and still be delivered.

See also E_D_TOV, RR_TOV.

R_RDY
Receiver ready. A primitive signal indicating that the port is ready to receive a frame.

RAID
Redundant Array of Independent Disks. A 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 Fabric
A fabric that spans across WANs by using protocol translation (a process also known as tunneling) such as Fibre Channel over ATM or Fibre Channel over IP.

Remote Switch
Bridges two switches into a SAN as large as 3000KM or more through protocol encapsulation in ATM networks via the Computer Network Technologies (CNT) UltraNet Open Systems Gateway.

Request Rate
The rate at which requests arrive at a servicing entity.

See also service rate.

RLS Probing
Read link status of the AL_PAs.

Root Account
A login used for debugging purposes by HP engineers and is not intended for customer use.

See also account level switches.

Route
As applies to a fabric, the communication path between two switches. May also apply to the specific path taken by an individual frame, from source to destination.

See also FSPF.

Routing
The assignment of frames to specific switch ports, according to frame destination.

RR_TOV
Resource Recovery Time-out Value. The minimum time a target device in a loop waits after a LIP before logging out a SCSI initiator.

See also E_D_TOV, R_A_TOV.

RS-232 port
A port that conforms to a set of Electrical Industries Association (EIA) standards. Used to connect DTE and DCE devices for communication between computers, terminals, and modems.

See also DCE port, DTE port.

RSCN
Registered State Change Notification. A switch function that allows notification of fabric changes to be sent from the switch to specified nodes.

RX_ID
Responder Exchange Identifier. A 2-byte field in the frame header used by the responder of the Exchange to identify frames as being part of a particular exchange.

SAN
Storage Area Network. A network of systems and storage devices that communicate using Fibre Channel protocols.

See also fabric.

SAN Switch
A switch whose main task is to connect nodes into the fabric.

See also core switch.

SCSI
Small Computer Systems Interface. A parallel bus architecture and protocol for transmitting large data blocks to a distance of 15 - 25 meters.

SDRAM
Synchronous Dynamic Random Access Memory. The main memory for the switch. Used for volatile storage during switch operation.

See also flash.

Sequence
A group of related frames transmitted in the same direction between two N_Ports.

Service Rate
The rate at which an entity can service requests.

See also request rate.

SFF
Small Form Factor.

SFP Cable

The latest innovation in high-speed copper cabling for Fibre Channel and InfiniBand. It incorporates the SFP module directly onto the cable assembly, eliminating the need for a separate SFP copper module and an HSSDC2 cable assembly.

SFP
Small form factor pluggable. A transceiver used on 2 Gbps switches that replaces the GBIC. Refers to the LC-form factor transceiver.

See also GBIC.

SID/DID
Source identifier/Destination identifier. S_ID is a 3-byte field in the frame header that is used to indicate the address identifier of the N_Port from which the frame was sent.

Single Mode
The fiber optic cabling standard that, when used in conjunction with a 1300 nm laser light, can transfer data up to 10 km between devices. When used in conjunction with a 1550 nm laser light, single mode cabling can transfer data over 10 km.

See also multimode, LWL, ELWL, and XLWL.

SI
Sequence Initiative.

SNMP
Simple Network Management Protocol. An internet management protocol that uses either IP for network-level functions and UDP for transport-level functions, or TCP/IP for both. Can be made available over other protocols, such as UDP/IP, because it does not rely on the underlying communication protocols.

See also Community (SNMP).

SNMPv1
The original SNMP, now labeled v1.

SNS
Simple Name Server. A switch service that stores names, addresses, and attributes for up to 15 minutes, and provides them as required to other devices in the fabric. SNS is defined by Fibre Channel standards and exists at a well-known address. May also be referred to as directory service.

See also FS.

StorageWorks SAN switch
The brand name for the HP family of switches.

Switch Name
The arbitrary name assigned to a switch.

Switch Port
A port on a switch. Switch ports can be E_Ports, F_Ports, or FL_Ports.

Switch
Hardware that routes frames according to Fibre Channel protocol and is controlled by software.

SWL
Short Wavelength. A type of fiber optic cabling that is based on 850-mm lasers and supports 1.0625-Gbps link speeds. May also refer to the type of GBIC or SFP.

See also LWL.

Tachyon
A chip developed by Hewlett-Packard, and used in various devices. This chip has FC-0 through FC-2 on one chip.

Target
A storage device on 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.

Terminal Serial Port
May also be referred to as the console port. The lower serial port on the CP Card of the StorageWorks Core switch. This port sends switch information messages and can receive commands. Can be used to connect the CP Card to a computer terminal. Has an RS-232 connector wired as a DTE device, and can be connected by serial cable to a DCE device. The connector pins two and three are swapped so that a straight-through cable can be used to connect to a terminal. The device name is ttyS0.

See also DCE port, modem serial port.

Throughput
The rate of data flow achieved within a cable, link, or system. Usually measured in bps (bits per second).

See also bandwidth.

Topology
As applies to Fibre Channel, the configuration of the Fibre Channel network and the resulting communication paths allowed. There are three possible topologies:

- Point to point: A direct link between two communication ports.
- Switched fabric: Multiple N_Ports linked to a switch by F_Ports.
- Arbitrated loop: Multiple NL_Ports connected in a loop.

Transceiver
Device that converts one form of signaling to another for transmission and reception; in fiber optics, it refers to optical and electrical.

Transfer State
The 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
A mode in which private devices can communicate with public devices across the fabric.

Transmission Character
A 10-bit character encoded according to the rules of the 8B/10B algorithm.

Transmission Word
A group of four transmission characters.

See also data word.

Trap (SNMP)
The message sent by an SNMP agent to inform the SNMP management station of a critical error.

See also SNMP.

Trunking
See ISL Trunking.

Tunneling
A technique for enabling two networks to communicate when the source and destination hosts are both on the same type of network, but are connected by a different type of network.

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

UDP
User Datagram Protocol. A protocol that runs on top of IP and provides port multiplexing for upper-level protocols.

ULP_TOV
Upper-level Time-out Value. The minimum time that a SCSI ULP process waits for SCSI status before initiating ULP recovery.

ULP
Upper-level Protocol. The protocol that runs on top of Fibre Channel. Typical upper-level protocols are SCSI, IP, HIPPI, and IPI.

Unicast
The transmission of data from a single source to a single destination.

See also broadcast, multicast.

user account
A login intended for use by the customer to monitor, but not control, switch operation.

See also account level switches.

VC
Virtual circuit. A one-way path between N_Ports that allows fractional bandwidth.

Web Tools
An HP product that runs on Fabric OS and provides a graphical interface to allow monitoring and management of individual switches or entire fabrics from a standard workstation running a browser.

Well-known Address
As pertaining to Fibre Channel, a logical address defined by the Fibre Channel standards as assigned to a specific function, and stored on the switch.

Workstation
A computer used to access and manage the fabric. May also be referred to as a management station or host.

WWN
World-Wide Name. An identifier that is unique worldwide. Each entity in a fabric has a separate WWN.

XLWL
Xtra Long Wave Length. Laser light with a periodic length greater than 1300 nm (e.g., 1420 or 1550). XLWL lasers are used to transmit Fibre Channel data over distances greater than 10 Km.

Also known as ELWL.

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
A set of devices and hosts attached to the same fabric and configured as being in the same zone. Devices and hosts within the same zone have access permission to others in the zone, but are not visible to any outside the zone.

See also Zoning.

Zone Alias
A name assigned to a device or group of devices in a zone. Aliases can greatly simplify the zone administrative process.

See also alias.

Zone Configuration
A specified set of zones. Enabling a configuration enables all zones in that configuration.

See also defined zone configuration, enabled zone configuration.

Zone Member
A port, node, WWN, or alias, which is part of a zone.

Zone Schemes
The level of zoning granularity selected. For example, zoning may be done by switch/port, WWN, AL_PA, or a mixture.

See also zone configuration.

Zone Set
See zone configuration.

Zoning
An HP product that runs on Fabric OS and allows partitioning of the fabric into logical groupings of devices. Devices in a zone can only access and be accessed by devices in the same zone.

See also zone.

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