Enterprise Fabric Suite 2007 User Guide

Sun Storage Fibre Channel Switch 5802

Firmware Version 7.4

Sun Microsystems, Inc.
www.sun.com

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Preface

This guide describes the Enterprise Fabric Suite™ 2007 application for Sun FC switches and directors. This guide introduces the switch management products and explains their installation and use. It is intended for users responsible for installing and using switch management tools.

How This Document Is Organized

The Enterprise Fabric Suite 2007 switch management application is the primary focus of this manual which is organized as follows:

- Chapter 1 describes how to use Enterprise Fabric Suite 2007, its menus, and its displays.
- Chapter 2 describes fabric management tasks.
- Chapter 3 describes fabric zoning management tasks.
- Chapter 4 describes fabric security management tasks.
- Chapter 5 describes switch management tasks.
- Chapter 6 describes port and device management tasks.

A glossary of terms and an index are also provided.

Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`

`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`**
		`Password:`

AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

Note – Characters display differently depending on browser settings. If characters do not display correctly, change the character encoding in your browser to Unicode UTF-8.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

`http://docs.sun.com/app/docs/prod/switch.dir#hic`

Application	Title	Part Number	Format	Location
Regulatory and safety information	*Sun Storage Regulatory and Safety Compliance Manual*	820-5506-*xx*	PDF	Online
Hardware and software requirements	*Sun Storage Fibre Channel Switch 5802 Hardware Release Notes*	820-5539-*xx*	PDF	Online
Initial switch installation	*Sun Storage Fibre Channel Switch 5802 Setup*	820-4950-*xx*	Printed PDF	Shipping kit Online

Application	Title	Part Number	Format	Location
Switch installation	*Sun Storage Fibre Channel Switch 5802 Installation Guide*	820-4969-*xx*	PDF	Online
Manage the switch	*Sun Storage Fibre Channel Switch 5802 QuickTools User Guide*	820-4972-*xx*	PDF	Online
Manage the switch	*Sun Storage Fibre Channel Switch 5802 Command Line Interface Guide*	820-4960-*xx*	PDF	Online
Command line interface reference	*Command Line Interface Quick Reference Guide*	820-4962-*xx*	PDF	Online
Look up messages and correct problems	*Event Message Guide*	820-4971-*xx*	PDF	Online
Manage the switch	*Simple Network Management Protocol Reference Guide*	820-4974-*xx*	PDF	Online
Manage the switch	*CIM Agent Reference Guide*	820-4959-*xx*	PDF	Online

Documentation, Support, Training, and Service

Sun Function	URL
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Support	`http://www.sun.com/support/`
Training	`http://www.sun.com/training/`
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CHAPTER 1

Using Enterprise Fabric Suite 2007

This section describes how to use the Enterprise Fabric Suite 2007 application and its menus. The following topics are covered:

- Workstation Requirements
- Installing Enterprise Fabric Suite 2007
- Starting Enterprise Fabric Suite 2007
- Exiting Enterprise Fabric Suite 2007
- Uninstalling Enterprise Fabric Suite 2007
- Changing the Encryption Key for the Default Fabric View File
- Saving and Opening Fabric View Files
- Setting Enterprise Fabric Suite 2007 Preferences
- Using Online Help
- Viewing Software Version and Copyright Information
- Enterprise Fabric Suite 2007 User Interface
- Using the Topology Display
- Using the Faceplate Display

Workstation Requirements

The requirements for fabric management workstations running Enterprise Fabric Suite 2007 are described in TABLE 1-1:

TABLE 1-1 Workstation Requirements

Operating System	• Windows 2003, XP SP1/SP2 • Solaris™ 9, 10, and 10 x86 Operating System (Solaris OS) • Red Hat Enterprise Linux 4, 5 • SUSE Linux Enterprise Server 9, 10
Memory	512 MB or more (1GB recommended)
Disk Space	150 MB per installation
Processor	1 GHz or faster
Hardware	CD-ROM drive, RJ-45 Ethernet port, RS-232 serial port (optional)
Internet Browser (to view online help)	• Microsoft Internet Explorer 6.0 and later • Netscape Navigator 6.0 and later • Firefox 1.5 and later

Installing Enterprise Fabric Suite 2007

You can install Enterprise Fabric Suite 2007 on a Windows, Linux, or Solaris OS workstation using the Enterprise Fabric Suite 2007 Installation Disk.

Note – Contact your switch distributor or authorized reseller to purchase Enterprise Fabric Suite 2007.

To install the Enterprise Fabric Suite 2007 application, do the following:

For a Windows platform:

1. Close all programs currently running, and insert the Enterprise Fabric Suite 2007 Installation Disk into the management workstation CD-ROM drive.
2. In the upper left corner of the product introduction screen, click Management Software.
3. Locate your platform in the table and click Install.

If the product introduction screen does not open in step 2, open the CD with Windows Explorer and run the installation program with the following path:

```
data\files\Management_Software\Windows\Windows_7.04.xx.xx.exe
```

For a Linux platform:

Open the CD and run the installation program with the following path:

```
data/files/Management_Software/Linux/Linux_7.04.xx.xx.bin
```

If there is no CD-ROM icon, do the following:

1. Open an xterm or other terminal window.
2. Mount the CD-ROM. From a shell prompt, enter the following:

   ```
   mount /mnt/cdrom
   ```

3. Change directory to the location of the install program:

   ```
   cd /mnt/cdrom/data/files/Management_Software/Linux
   ```

4. Execute the install program and follow the installation instructions.

   ```
   Linux_7.04.xx.xx.bin
   ```

For a Solaris OS platform:

1. Open a terminal window. If the disk isn't already mounted, enter the following command:

   ```
   volcheck
   ```

2. Enter following command to move to the directory on the CD that contains the executable:

   ```
   cd /cdrom/cdrom0/data/files/Management_Software/solaris
   ```

3. Execute the install program and follow the installation instructions:

   ```
   Solaris_7.04.xx.xx.bin
   ```

Starting Enterprise Fabric Suite 2007

To start Enterprise Fabric Suite 2007 for the first time, do the following.

1. Start the Enterprise Fabric Suite 2007 application using one of the following methods:
   - For Windows, double-click the Enterprise Fabric Suite 2007 shortcut, or select Enterprise Fabric Suite 2007 from Start menu, depending on how you installed the application. From a command line, enter the following command:

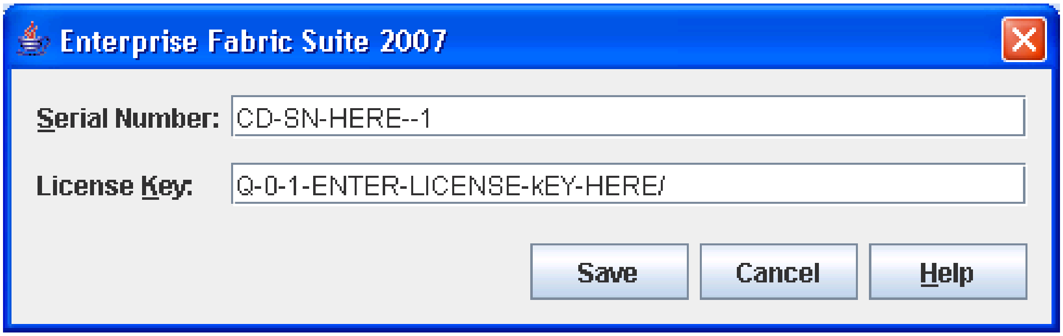
     ```
     <install_directory>\Enterprise_Fabric_Suite_2007.exe
     ```

   - For Linux or Solaris OS enter the Enterprise_Fabric_Suite_2007 command:

```
<install_directory>./Enterprise_Fabric_Suite_2007
```

2. The serial number/license key dialog allows you to enter the serial number on the Enterprise Fabric Suite 2007 CD ROM to activate the application, and to enter license keys you have purchased, if any. Refer to "Installing Feature License Keys" on page 154 for more information on license keys. Choose one of the following:
   - If you have not purchased license keys, enter the serial number on the Enterprise Fabric Suite 2007 CD ROM and click the Save button.
   - If you have purchased a license key(s), enter the serial number on the Enterprise Fabric Suite 2007 CD ROM, enter the license keys, and click the Save button.

FIGURE 1-1 Enter CD Serial Number and License Key Dialog



Enterprise Fabric Suite 2007

Serial Number: CD-SN-HERE--1

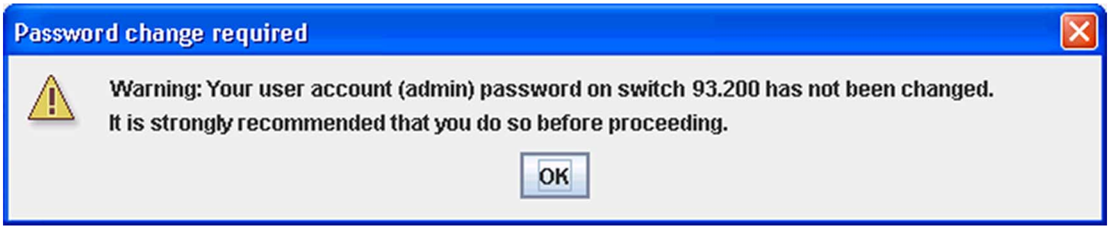
License Key: Q-0-1-ENTER-LICENSE-kEY-HERE/

Note – If this is not the first session, you can update the current serial number or license key. Open the Help menu and select License Info. On information dialog, click the Enter Key button to openthe dialog below.

---

3. When Enterprise Fabric Suite 2007 first establishes a connection with a switch, for security reasons, you will be prompted (FIGURE 1-2) to change your user account password initially set up by the administrator. You will be prompted to change the default password each time you attempt to open the fabric until you change the password. Click the OK button, and change the user account password. Refer to "Managing User Accounts" on page 104 for more information.

FIGURE 1-2 Password Change Required Dialog



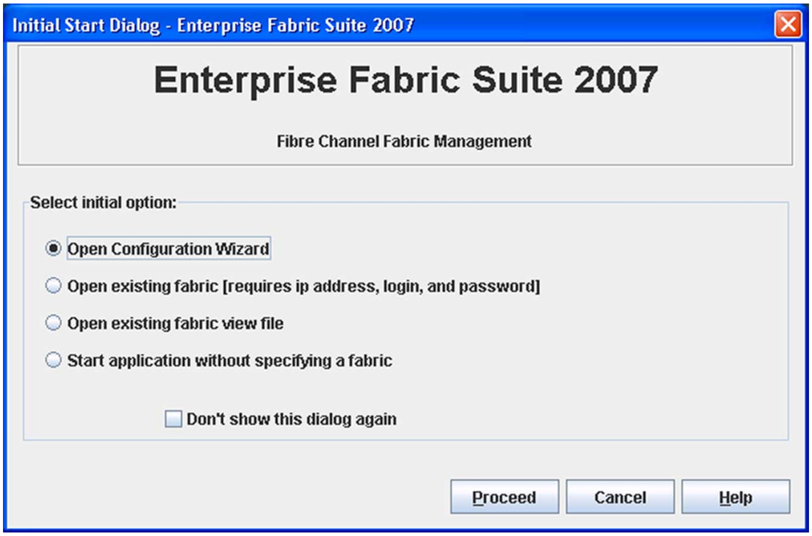
Password change required

Warning: Your user account (admin) password on switch 93.200 has not been changed.
It is strongly recommended that you do so before proceeding.

4. If this is the first time you are managing this switch, in the Initial Start dialog, click the Open Configuration Wizard button. When you power-up the switch, the Configuration Wizard will recognize the switch and lead you through the configuration process.

When starting Enterprise Fabric Suite 2007 the first time, the application opens with the Initial Start dialog (FIGURE 1-3). If you prefer not to see this dialog, select the Don't show this dialog again option. This has the same effect as disabling the Display Initial Start Dialog preference. Refer to "Setting Enterprise Fabric Suite 2007 Preferences" on page 9 for information about setting preferences.

FIGURE 1-3 Initial Start Dialog



Initial Start Dialog - Enterprise Fabric Suite 2007

Enterprise Fabric Suite 2007

Fibre Channel Fabric Management

Select initial option:

● Open Configuration Wizard

○ Open existing fabric [requires ip address, login, and password]

○ Open existing fabric view file

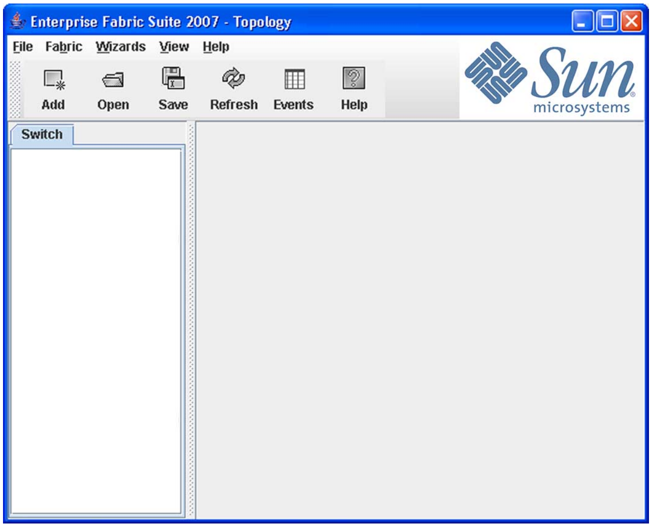
○ Start application without specifying a fabric

□ Don't show this dialog again

- Select the Open Configuration Wizard option to open the Configuration Wizard to configure a switch, add a new switch, replace/restore a switch, or recover or edit an IP configuration of an existing switch.
- Select the Open Existing Fabric option to open the Add a New Fabric dialog, which prompts you for a fabric name, IP address, account name, and password. Refer to "Adding a Fabric" on page 33.

- Select the Open Existing Fabric View File option to open the Open View dialog which prompts you to specify a fabric view file that you saved earlier. Refer to "Opening a Fabric View File" on page 35.
- Select the Start Application Without Specifying a Fabric option to open the Enterprise Fabric Suite 2007 window (FIGURE 1-4).

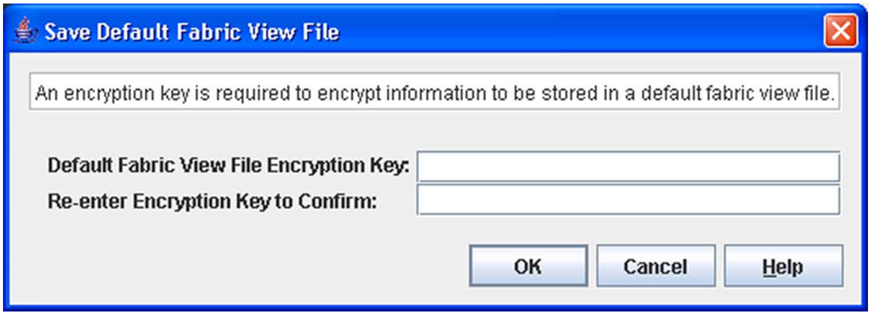
FIGURE 1-4 Enterprise Fabric Suite 2007 Window



Exiting Enterprise Fabric Suite 2007

To exit a Enterprise Fabric Suite 2007 application session, open the File menu and select Exit. If you have not yet saved the default fabric view file, the Save Default Fabric View File dialog (FIGURE 1-5) prompts you to save the current fabric view as the default fabric view file. Enter an encryption key in the Default Fabric File Encryption Key field. Re-enter the encryption key in the Re-enter Encryption Key to Confirm field. Click the OK button to save the current set of fabrics to the default fabric view file in the working directory.

FIGURE 1-5 Save Default Fabric View File Dialog



Save Default Fabric View File

An encryption key is required to encrypt information to be stored in a default fabric view file.

Default Fabric View File Encryption Key:

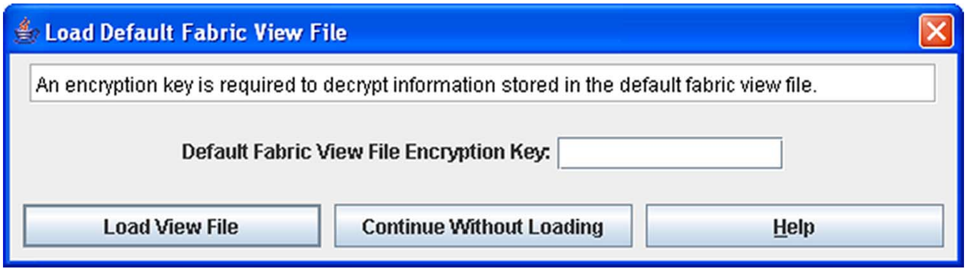
Re-enter Encryption Key to Confirm:

The encryption key is used to encrypt the sensitive data in the default fabric view file. Refer to "Changing the Encryption Key for the Default Fabric View File" on page 8 for information about changing this encryption key. If an encryption key has been defined and the View File Auto Save and Load preferences settings are set to Enable, the current fabric view is automatically saved to your default fabric view file when you close future Enterprise Fabric Suite 2007 sessions.

To prevent Enterprise Fabric Suite 2007 from prompting you to save the default fabric view file between Enterprise Fabric Suite 2007 sessions, set the View File Auto Save and Load preferences setting to Enable (default). Refer to "Setting Enterprise Fabric Suite 2007 Preferences" on page 9 for more information.

In your next Enterprise Fabric Suite 2007 session, the Load Default Fabric File dialog (FIGURE 1-6) prompts you to load the default fabric view file and to specify its encryption key, if there is one. In the Default Fabric File Encryption Key field, enter the encryption key and click the Load View File button. If you do not want to load the default fabric view file, click the Continue Without Loading button to open the Enterprise Fabric Suite 2007 with no fabric displayed.

FIGURE 1-6 Load Default Fabric File Dialog



Load Default Fabric View File

An encryption key is required to decrypt information stored in the default fabric view file.

Default Fabric View File Encryption Key:

Uninstalling Enterprise Fabric Suite 2007

A program to uninstall Enterprise Fabric Suite 2007 was included as part of the installation process. The UninstallerData folder in the Install directory contains the uninstall program Uninstall_Enterprise Fabric Suite 2007. Also, a shortcut/link to the uninstall program was installed in the installation directory during the Enterprise Fabric Suite 2007 installation process.

The default installation directories are:

- For Windows: C:\Program Files\Sun\Enterprise_Fabric_Suite_2007
- For Linux: /opt/Sun/Enterprise_Fabric_Suite_2007
- For Solaris OS: /usr/opt/Sun/Enterprise_Fabric_Suite_2007

To uninstall the Enterprise Fabric Suite 2007 application, do the following:

- For Windows, browse for the uninstall program file or the shortcut/link that points to the uninstall program file. The uninstall program shortcut is in the same folder as the program shortcut (Start menu, program group, on desktop, or user specified) that is used to start the Enterprise Fabric Suite 2007 application. Double-click the uninstall program file or shortcut/link, and follow the instructions to uninstall the Enterprise Fabric Suite 2007 application.
- For Linux or Solaris OS, execute the link to Uninstall_Enterprise_Fabric_Suite_2007. If no links were created during the installation, enter the Uninstall_Enterprise_Fabric_Suite_2007 command from the following directory:

  ```
  UninstallerData/Uninstall_Enterprise_Fabric_Suite_2007
  ```

Changing the Encryption Key for the Default Fabric View File

To change the encryption key for the Enterprise Fabric Suite 2007 default fabric view file, do the following:

1. Open the File menu and select Save Default Fabric View File to open the Save Default Fabric View File dialog. Enter an encryption key in the Default Fabric File Encryption Key field.

2. Re-enter the same encryption key in the Re-enter Encryption Key to Confirm field.

3. Click the OK button to save the current set of fabrics to the default fabric view file in the working directory.

Saving and Opening Fabric View Files

A fabric view file is one or more fabrics saved to a file. In addition to the Enterprise Fabric Suite 2007 default fabric view file, you can save and open your own fabric view files. To save a set of fabrics to a file, do the following:

1. Open the File menu and select Save View As to open the Save View dialog.
2. Enter a name for the fabric view file or click the Browse button to select an existing file. Files are saved in the working directory.
3. Enter a password. When you attempt to open this fabric view file, you will be prompted for this password. If you leave the File Password field blank, no password will be required when attempting to open this fabric view file.
4. Click the OK button to save the view.

To open a fabric view file, do the following:

1. Open the File menu and select Open View File to open the Open View dialog.
2. Enter a name for the fabric view file or click the Browse button to select an existing file.
3. If the fabric view file was saved with a password, enter the password and click the OK button.
4. Click the OK button to open the view.

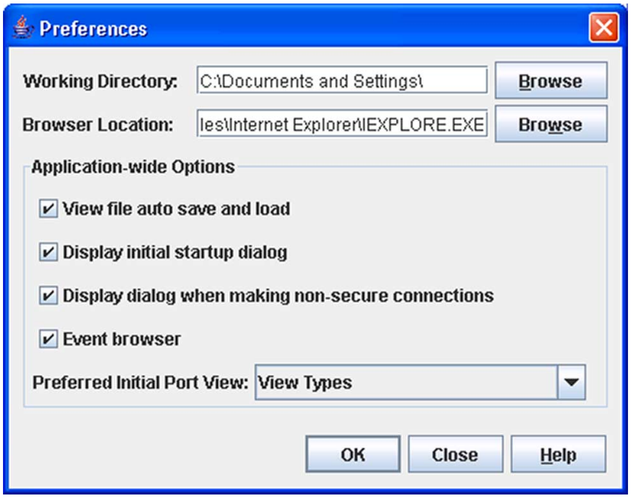
Setting Enterprise Fabric Suite 2007 Preferences

Using the Preferences dialog (FIGURE 1-7) you can:

- Change the location of the working directory in which to save files.
- Change the location of the browser used to view the online help.

- Enable (default) or disable the view file auto save and load feature. Refer to "Exiting Enterprise Fabric Suite 2007" on page 6 for more information on the default fabric view file.
- Enable (default) or disable the use of the Initial Start Dialog at the beginning of an Enterprise Fabric Suite 2007 session. Refer to "Starting Enterprise Fabric Suite 2007" on page 3 for information about the Initial Start Dialog. After a default fabric view file is created, this setting has no effect.
- Enable (default) or disable the Non Secure Connections Check dialog that is displayed when you attempt to open a non secure fabric. If Display Dialog When Making Non-secure Connections is enabled, you can open a fabric with a non-secure fabric. Otherwise, you must have a secure connection.
- Enable (default) or disable the Event Browser. Refer to "Displaying the Event Browser" on page 42. If the Event Browser is enabled using the Preferences dialog (FIGURE 1-7), the next time Enterprise Fabric Suite 2007 is started, all events will be displayed. If the Event Browser is disabled when Enterprise Fabric Suite 2007 is started and later enabled, only those events from the time the Event Browser was enabled and forward will be displayed.
- Choose the default port view when opening the faceplate display. You can set the faceplate to reflect the current port type (default), port speed, port operational state, or port transceiver media. Regardless of the default port view you choose, you can change the port view in the faceplate display by opening the View menu and selecting a different port view option. Refer to the corresponding subsection for more information:
  - "Displaying Port Types" on page 179
  - "Displaying Port Operational States" on page 180
  - "Displaying Port Speeds" on page 180
  - "Displaying Transceiver Media Status" on page 181

FIGURE 1-7 Preferences Dialog – Enterprise Fabric Suite 2007



Preferences

Working Directory: C:\Documents and Settings\

Browser Location: les\Internet Explorer\IEXPLORE.EXE

Application-wide Options

☑ View file auto save and load

☑ Display initial startup dialog

☑ Display dialog when making non-secure connections

☑ Event browser

Preferred Initial Port View: View Types

To set preferences for your Enterprise Fabric Suite 2007 sessions, do the following:

1. Open the File menu, and select Preferences to open the Preferences dialog.
2. Enter or browse for the paths to the working directory and browser.
3. In the Application-wide Options area, choose the preferences you want.
4. Click the OK button to save the changes.

Using Online Help

The browser-based online help system can be accessed from the Enterprise Fabric Suite 2007 application several ways. Online help is also context-sensitive, that is, the online help opens to the topic that describes the dialog you have open.

To open the first topic in the help system, choose one of the following:

- Open the Help menu and select Help Topics
- Click the Help button in the tool bar
- With no dialog displayed, press the F1 function key

To open the help system to the topic that describes the dialog you have open, choose one of the following:

- Click the Help button in the dialog
- Press the F1 function key

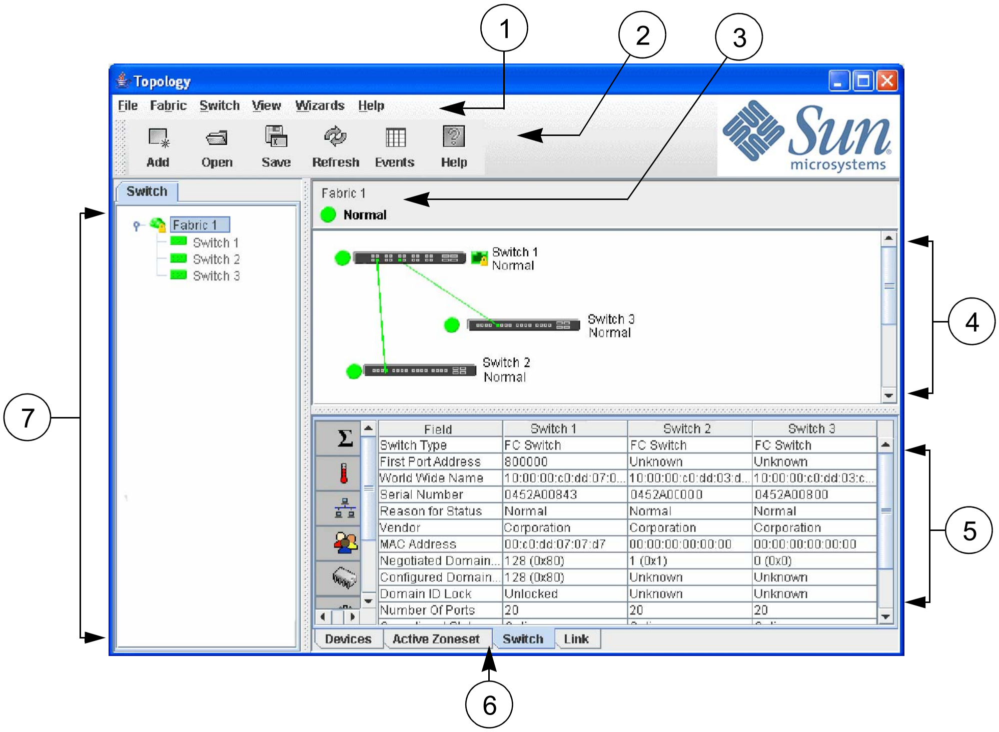
Viewing Software Version and Copyright Information

To view Enterprise Fabric Suite 2007 software version and copyright information, open the Help menu and select About.

Enterprise Fabric Suite 2007 User Interface

The Enterprise Fabric Suite 2007 application uses the topology display (FIGURE 1-8) to manage the fabric. The topology display shows all switches in the fabric that are able to communicate and all connections between switches. All display types share the basic elements including fabric tree, menu bar, tool bar, graphic window, data window, and data window tabs.

FIGURE 1-8 Topology Display Elements



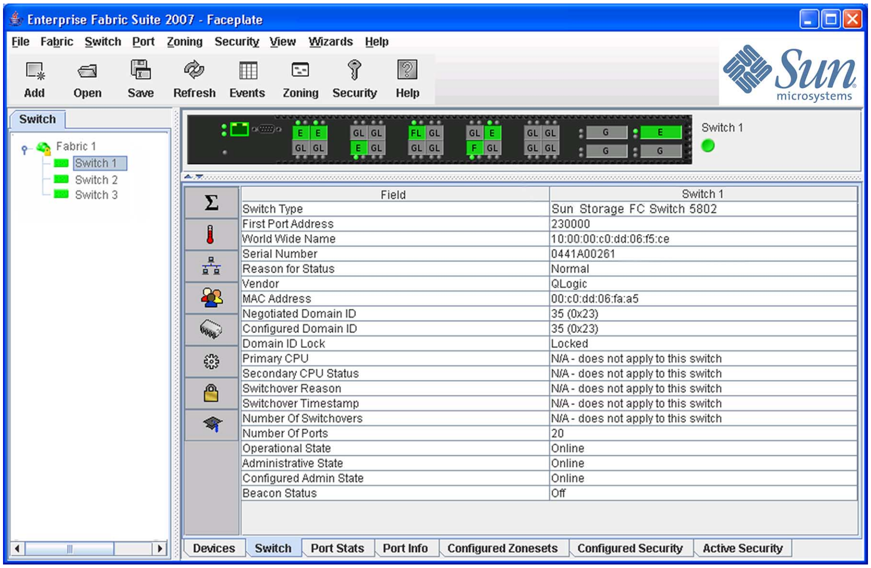
Field	Switch 1	Switch 2	Switch 3
Switch Type	FC Switch	FC Switch	FC Switch
First Port Address	800000	Unknown	Unknown
World Wide Name	10:00:00:c0:dd:07:0...	10:00:00:c0:dd:03:d...	10:00:00:c0:dd:03:c...
Serial Number	0452A00843	0452A0C000	0452A00800
Reason for Status	Normal	Normal	Normal
Vendor	Corporation	Corporation	Corporation
MAC Address	00:c0:dd:07:07:d7	00:00:00:00:00:00	00:00:00:00:00:00
Negotiated Domain...	128 (0x80)	1 (0x1)	0 (0x0)
Configured Domain...	128 (0x80)	Unknown	Unknown
Domain ID Lock	Unlocked	Unknown	Unknown
Number Of Ports	20	20	20

Figure Legend

1	Menu Bar	**5**	Data Window
2	Tool Bar	**6**	Data Window Tabs
3	Switch/Fabric Name and Status	**7**	Fabric Tree
4	Graphic Window		

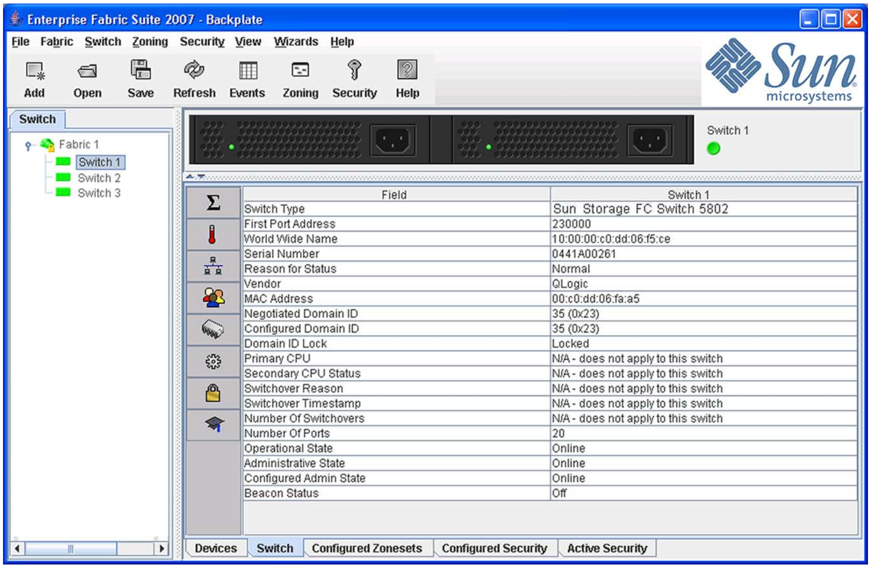
The faceplate display (FIGURE 1-9) and backplate display (FIGURE 1-10) are used to manage individual switches. The faceplate display shows the front of a single switch and its ports. The backplate display shows the back of a single switch.

FIGURE 1-9 Faceplate Display


Enterprise Fabric Suite 2007 - Faceplate
File Fabric Switch Port Zoning Security View Wizards Help
Add Open Save Refresh Events Zoning Security Help
Sun microsystems
Switch
Fabric 1
Switch 1
Switch 2
Switch 3
Switch 1
Devices Switch Port Stats Port Info Configured Zonesets Configured Security Active Security

Field	Switch 1
Switch Type	Sun Storage FC Switch 5802
First Port Address	230000
World Wide Name	10:00:00:c0:dd:06:f5:ce
Serial Number	0441A00261
Reason for Status	Normal
Vendor	QLogic
MAC Address	00:c0:dd:06:fa:a5
Negotiated Domain ID	35 (0x23)
Configured Domain ID	35 (0x23)
Domain ID Lock	Locked
Primary CPU	N/A - does not apply to this switch
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Switchover Timestamp	N/A - does not apply to this switch
Number Of Switchovers	N/A - does not apply to this switch
Number Of Ports	20
Operational State	Online
Administrative State	Online
Configured Admin State	Online
Beacon Status	Off

FIGURE 1-10 Backplate Display

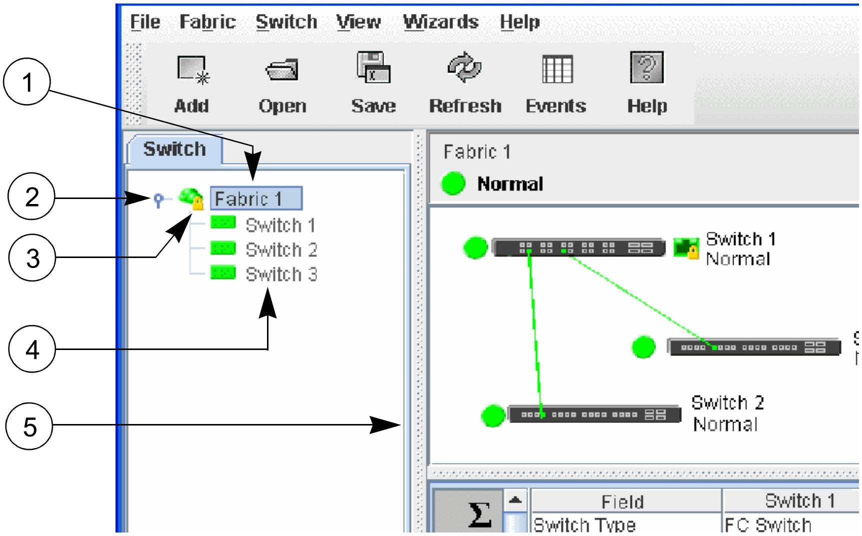

Enterprise Fabric Suite 2007 - Backplate
File Fabric Switch Zoning Security View Wizards Help
Add Open Save Refresh Events Zoning Security Help
Sun microsystems
Switch
Fabric 1
Switch 1
Switch 2
Switch 3
Switch 1
Devices Switch Configured Zonesets Configured Security Active Security

Field	Switch 1
Switch Type	Sun Storage FC Switch 5802
First Port Address	230000
World Wide Name	10:00:00:c0:dd:06:f5:ce
Serial Number	0441A00261
Reason for Status	Normal
Vendor	QLogic
MAC Address	00:c0:dd:06:fa:a5
Negotiated Domain ID	35 (0x23)
Configured Domain ID	35 (0x23)
Domain ID Lock	Locked
Primary CPU	N/A - does not apply to this switch
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Switchover Timestamp	N/A - does not apply to this switch
Number Of Switchovers	N/A - does not apply to this switch
Number Of Ports	20
Operational State	Online
Administrative State	Online
Configured Admin State	Online
Beacon Status	Off

Fabric Tree

The fabric tree lists the managed fabrics and their switchesFIGURE 1-11. The window width can be adjusted by clicking and dragging the moveable window border. An fabric name entry handle located to the left of an entry in the tree indicates that the entry can be expanded or collapsed. Click this handle or double-click the entry to expand or collapse a fabric tree entry. A fabric entry expands to show its member switches.

FIGURE 1-11 Fabric Tree



Field	Switch 1
Switch Type	FC Switch

Figure Legend

1	Fabric Name Entry	**4**	Switch Entries
2	Fabric Name Entry Handle	**5**	Moveable Window Border
3	Security Lock Icon		

The fabric tree provides access to the topology and faceplate displays for any fabric or switch.

- To open the topology display from the fabric tree, click a fabric entry.
- To open the faceplate/backplate displays from the fabric tree, click a switch entry.

Each fabric tree entry has a small icon next to it that uses color to indicate operational status.

- A green icon indicates normal operation.

- A yellow icon indicates the switch is operational, but may require attention to maintain maximum performance.
- A red icon indicates a potential failure or non-operational state as when the switch is offline.
- A blue icon indicates that a switch is unknown, unreachable, or unmanageable.

If the status of the fabric is not normal, the fabric icon in the fabric tree will indicate the reason for the abnormal status. The same message is provided when you rest the mouse over the fabric icon in the fabric tree.

Note – The small lock icon next to the fabric icon in the fabric tree indicates a secure fabric connection (SSL — Secure Socket Layer). The Security menu is available only on a secure fabric and on the entry switch (out of band switch). Open the Switch menu and select Services to enable the SSL option for that switch. You must then close the fabric and re-establish a connection to secure the fabric using SSL.

Graphic Window

The graphic window (FIGURE 1-8) presents graphic information about fabrics and switches such as the fabric topology and the switch faceplate. The window height can be adjusted by clicking and dragging the window border that it shares with the data window.

The faceplate display (FIGURE 1-9) shows the front of a switch. To view the faceplate display, open the View menu, and select View Faceplate.

The backplate display (FIGURE 1-10) shows the back of the switch. To view the backplate display, open the View menu, and select View Backplate.

Data Window and Tabs

The data window (FIGURE 1-8) presents a table of data and statistics associated with the selected tab. Use the scroll bar to browse through the data. The window length can be adjusted by clicking and dragging the border that it shares with the graphic window.

Adjust the column width by moving the pointer over the column heading border shared by two columns until a right/left arrow graphic is displayed. Click and drag the arrow to the desired width.

The data window tabs present options for the type of information to display in the data window. These options vary depending on the display.

Menus

The Enterprise Fabric Suite 2007 menus and the tasks offered in them vary depending on the display. For example, the Port menu and many of the Switch menu selections are only available in the faceplate display. Refer to "Topology Display Menu" on page 17 and "Faceplate Display Menu" on page 18 for information on the menus.

Topology Display Menu

TABLE 1-2 lists the topology display menu options.

TABLE 1-2 Topology Menu Options

Menu	Options
File	Open View File Save View As Save Default Fabric View File Preferences Exit
Fabric	Add Fabric Remove Fabric Nicknames Fabric Tracker Security Consistency Checklist Rediscover Fabric Start Performance View FC TraceRoute (requires SANdoctor license key) Show Event Browser
Switch	Delete (available only if one switch is selected) Export Devices Switch Properties (available only if one switch is selected) Network Properties (available only if one switch is selected) SNMP Properties (available only if one switch is selected)
Stack (these options are available only if one stack is selected in the graphic window)	Delete Syslog SNMP Properties Set Date/Time User Accounts Security Consistency Checklist Load Firmware Edit Zoning Configuration

TABLE 1-2 Topology Menu Options *(Continued)*

Menu	Options
View	Refresh Layout Topology Toggle Auto Layout Remember Layout
Wizards	Configuration Wizard
Help	Help Topics License Info About

Faceplate Display Menu

TABLE 1-3 lists the faceplate display menu options.

TABLE 1-3 Faceplate Menu Options

Menu	Options
File	Open View File Save View As Save Default Fabric View File Preferences Exit
Fabric	Add Fabric Remove Fabric Nicknames Fabric Tracker FC TraceRoute (requires SANdoctor license key) Show Event Browser

TABLE 1-3 Faceplate Menu Options *(Continued)*

Menu	Options
Switch	Archive Restore User Accounts Set Date/Time Switch Properties Advanced Switch Properties (available only on entry switch) Services Call Home (Setup, Profile Manager, Message Queue, Test Profile, Change Over) Security Consistency Checklist Network (Network Properties, IPv6 Ipsec Properties (available only on secure entry switch)) SNMP (SNMP Properties, SNMP v3 Manager (available only on secure entry switch)) Switch Diagnostics (Online Switch Diagnostics, Offline Switch Diagnostics) Toggle Beacons Port Threshold Alarm Configuration Load Firmware Reset Switch (Hot Reset, Reset, Hard Reset) Restore Factory Defaults Features Radius Servers Download Support File FC Ping (requires SANdoctor license key)
Stack	Refresh Stack Select All Ports Syslog SNMP Properties Set Date/Time User Accounts Security Consistency Checklist Reset Load Firmware Move Switch Up (available when a switch in stack is selected) Move Switch Down (available when a switch in stack is selected) Remove Switch (available when a switch in stack is selected) Remove Links

TABLE 1-3 Faceplate Menu Options *(Continued)*

Menu	Options
Port	Port Properties Advanced Port Properties Reset Port Port Binding Port Diagnostics (requires SANdoctor license key) Move Port
Zoning	Edit Zoning Resolve Zoning (Capture Active Zoning, Restore Configured Zoning, Capture Merged Zoning, View Merged/Configured Differences) Edit Zoning Config Activate Zone Set Deactivate Zone Set Restore Default Zoning
Security	Edit Security Edit Security Config Activate Security Set Deactivate Security Set
View	Refresh View Port Types View Port States View Port Speeds View Port Media View Faceplate View Backplate
Wizards	Configuration Wizard Extended Credit Wizard Zoning Wizard
Help	Help Topics License Info About

Menu Shortcut Keys

Shortcut key combinations, available in both the topology and faceplate displays, provide an alternative method of accessing menu options in the application. For example, to exit the application, press Alt+F, then press X. The shortcut key combinations are not case-sensitive.

Press the F1 function key to open the online help system. With no dialog displayed, the online help system opens to the first topic. With a dialog displayed, the help system opens to the topic describing that dialog.

Popup Menus

Popup (or shortcut) menus provide quick access to the menu options within the current context of the application. They are displayed when you right-click on certain areas of the topology or faceplate displays, such as inside the graphic window of the topology display, or on a port on the faceplate display. The options available in popup menus vary by display type (topology or faceplate) and where you click.

Note – Additionally, mouse-over information is displayed when you rest the cursor over key elements in the Enterprise Fabric Suite 2007 interface, such as ports, LEDs, and fabric tree entries.

Opening the Topology Popup Menus

The topology display also offers a fabric, switch, and a link popup menu:

- To open the fabric popup menu, right-click the graphic window background. The fabric popup menu presents selections to refresh the fabric, select all switches, select all links, or layout topology.
- To open the switch popup menu, right-click the switch icon in the graphic window. The switch popup menu presents selections to refresh the switch, delete the switch from the display, open the Switch Properties dialog, or open the Network Properties dialog.
- To open the link popup menu, right-click the link. The Link popup menu presents a selection to delete the link from the display.

Opening the Faceplate Popup Menus

To open the faceplate popup menu, right-click the faceplate image. The faceplate popup menu presents selections to refresh the switch, select all ports, open the Switch Properties dialog, open the Network Properties dialog, open the SNMP Properties dialog, use the Extended Credits Wizard, open the Port Properties dialog, run port diagnostic tests, configure RADIUS servers, open the Services dialog, and view the Security Consistency Checklist dialog.

If no ports are selected, the port-related tasks will be unavailable in the popup menu. Right-click a port to open the corresponding popup menu. Press the Shift or Control key to select more than one port. If multiple ports are selected, right-click one of the selected ports.

Tool Bar

The tool bar consists of a row of graphical buttons that you can use to access Enterprise Fabric Suite 2007 functions. The tool bar buttons are an alternative method to using the menu bar. TABLE 1-4 describes the tool bar buttons.

TABLE 1-4 Tool Bar Buttons

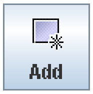
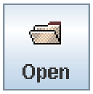
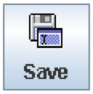
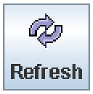
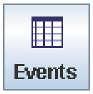
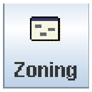
Button	Description
	Add Fabric — adds a new fabric to the fabric view.
	Open View File — opens an existing fabric view file.
	Save View As — saves the current fabric view to a file.
	Refresh — updates the topology or faceplate display with current information.
	Event Browser — opens the events browser.
	Edit Zoning — opens the Edit Zoning dialog (available only in faceplate/backplate displays).

TABLE 1-4 Tool Bar Buttons *(Continued)*

Button	Description
Security	Edit Security — opens the Edit Security dialog (faceplate/backplate displays on entry switch that has a secure fabric connection (SSL enabled).
Help	Help Topics — opens the online help file.
Sun microsystems	The Sun Microsystems logo opens a browser to the Sun Microsystems Web site.

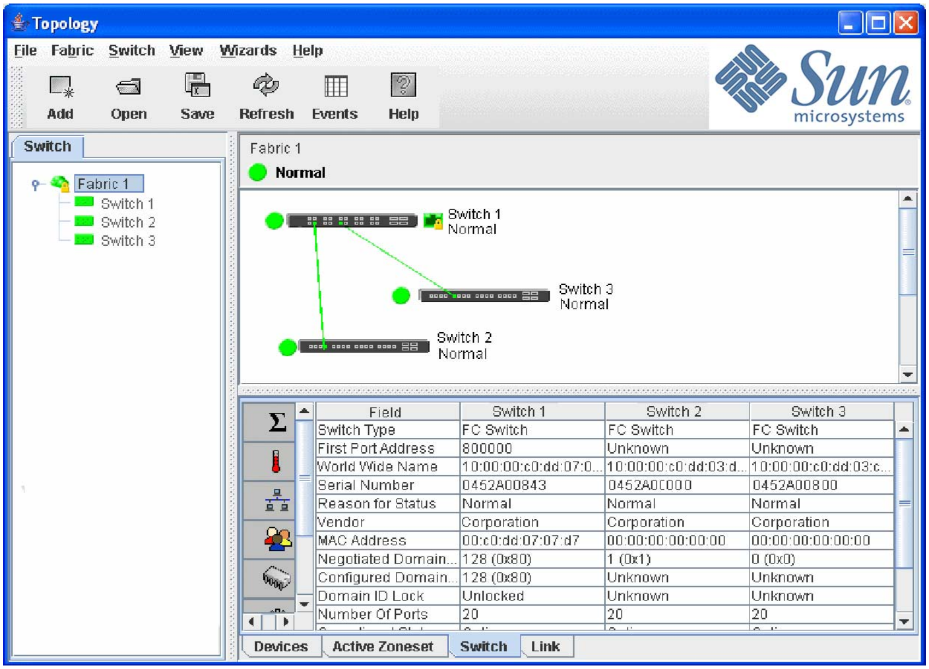
Using the Topology Display

The topology display (FIGURE 1-12) receives information from the selected fabric and displays its topology. Switches and inter-switch links (ISLs) appear in the graphic window and use color to indicate status.

- Working with Switches and Links
- Selecting Switches and Links
- Arranging Switches in the Topology Display
- Topology Data Windows

Note – Mouse-over information is displayed when you rest the cursor over key elements in the Enterprise Fabric Suite 2007 interface, such as ports LEDs, and fabric tree entries.

FIGURE 1-12 Topology Display



Field	Switch 1	Switch 2	Switch 3
Switch Type	FC Switch	FC Switch	FC Switch
First Port Address	800000	Unknown	Unknown
World Wide Name	10:00:00:c0:dd:07:0...	10:00:00:c0:dd:03:d...	10:00:00:c0:dd:03:c...
Serial Number	0452A00843	0452A0C000	0452A00800
Reason for Status	Normal	Normal	Normal
Vendor	Corporation	Corporation	Corporation
MAC Address	00:c0:dd:07:07:d7	00:00:00:00:00:00	00:00:00:00:00:00
Negotiated Domain...	128 (0x80)	1 (0x1)	0 (0x0)
Configured Domain...	128 (0x80)	Unknown	Unknown
Domain ID Lock	Unlocked	Unknown	Unknown
Number Of Ports	20	20	20

Working with Switches and Links

Switch and link icons are selectable and moveable, and serve as access points for other displays and menus. You select switches and links to display information about them, modify their configuration, or delete them from the display. Context-sensitive popup menus are displayed when you right-click on a switch or link icon, or in the background of the topology display and graphic window.

Switch icon shape and color provide information about the switch and its operational state. Lines represent links between switches. The topology display uses green to indicate normal operation, yellow to indicate operational with errors, red to indicate a potential failure or non-operational state, and blue to indicate unknown, unreachable, or unmanageable. Refer to "Displaying Fabric Status" on page 41 for more information about topology display icons.

Selecting Switches and Links

Selected ISL links in the topology display are displayed with a heavier line. Selected switches are displayed with a light blue background. You can select switches and links the following ways:

- To select one switch or link, click the switch or link.
- To select a group of switches or links, press the Shift or Control key while clicking each switch or link.
- To select all switches or links, right-click anywhere in the graphic window background, and select Select All Links or Select All Switches from the popup menu.
- To cancel all selections, click in the background of the graphic window.
- To un-select one switch or link in a group of selected switches and/or links, press the Shift or Control key while clicking the switch or link.
- To add a switch or link to a group of selected switches and/or links, press the Shift or Control key while clicking the switch or link.

Arranging Switches in the Topology Display

You can arrange individual switch icons in the topology display or allow Enterprise Fabric Suite 2007 to arrange all switch icons for you:

- To move an individual switch icon, click and drag the icon to another location in the graphic window. Links stretch or contract to remain connected.
- To arrange all switch icons in the topology display automatically, open the View menu and select Layout Topology.

By default, the Toggle Auto Layout box in the View menu is selected which causes Enterprise Fabric Suite 2007 to arrange the icons when you select Layout Topology.

You can save a custom arrangement, or layout, and restore that layout during a Enterprise Fabric Suite 2007 session. Begin by arranging the icons, then open the View menu and select Remember Layout. To restore the saved layout, open the View menu, unselect the Toggle Auto Layout option, and select Layout Topology.

Topology Data Windows

The topology display provides the following data windows corresponding to the data window tabs:

- Devices — displays all devices logged with the name server and their addresses within the current fabric configuration, and displays information from the fabric and allows devices to register certain information with the fabric. Refer to "Devices Data Window" on page 40 for more information.
- Active Zoneset — displays the active zone set for the fabric including zones and their member ports. Refer to "Active Zoneset Data Window" on page 58 for more information about this data window. Refer to "Zoning a Fabric" on page 60 for information about zone sets and zones.

- Switch — displays current network and switch configuration data for the selected switches. Refer to "Switch Data Window" on page 109 for more information.
- Link — displays information about the inter-switch links. Refer to "Link and Stack Link Data Windows" on page 39 for more information.

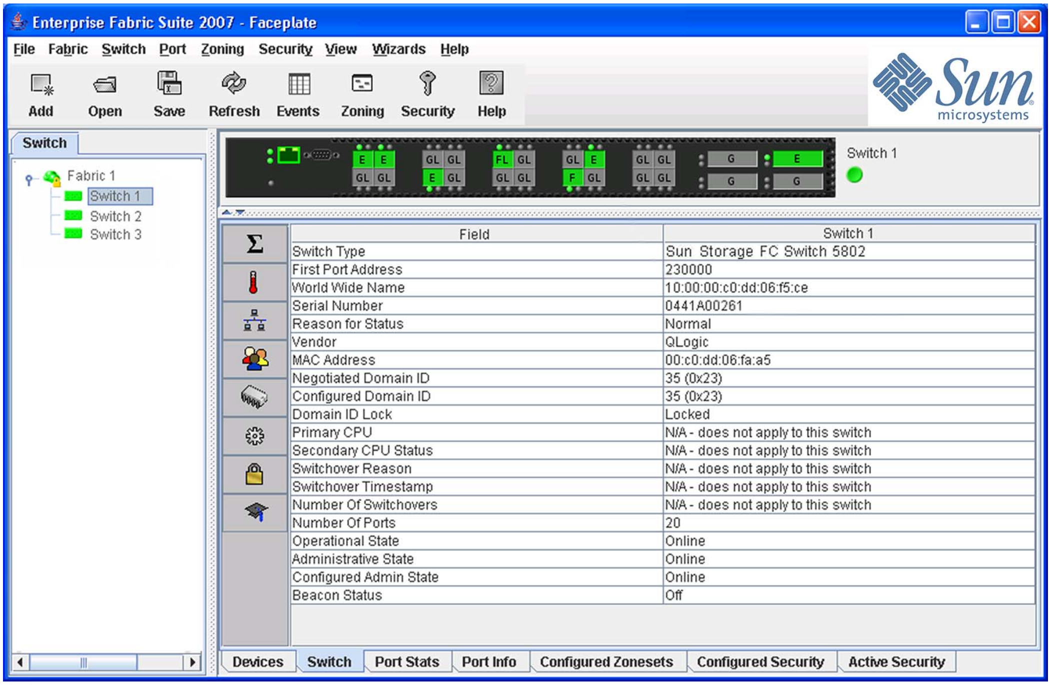
Using the Faceplate Display

The faceplate display (FIGURE 1-13) shows the front of a single switch, the switch name, the switch operational state, the ports, and the port status. To open the faceplate display when viewing the topology display, click the switch name/icon in the fabric tree, or double-click the switch icon in the graphic window.

- Alerts Panel
- Port Views and Status
- Working with Ports
- Faceplate Data Windows

Note – Additionally, mouse-over information is displayed when you rest the cursor over key elements in the Enterprise Fabric Suite 2007 interface, such as ports, LEDs, and fabric tree entries.

FIGURE 1-13 Faceplate Display



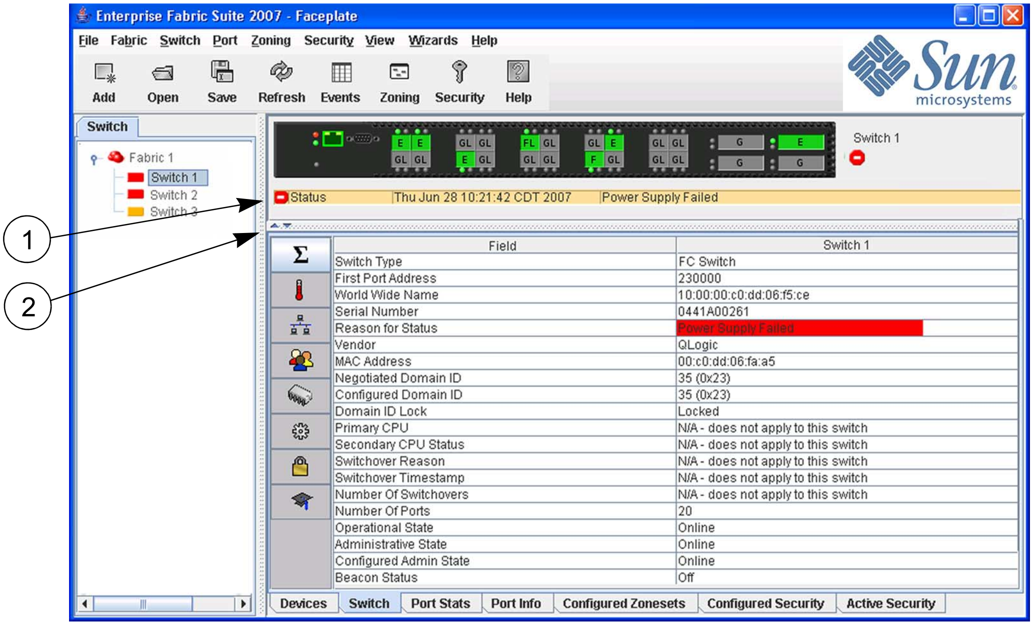
Field	Switch 1
Switch Type	Sun Storage FC Switch 5802
First Port Address	230000
World Wide Name	10:00:00:c0:dd:06:f5:ce
Serial Number	0441A00261
Reason for Status	Normal
Vendor	QLogic
MAC Address	00:c0:dd:06:fa:a5
Negotiated Domain ID	35 (0x23)
Configured Domain ID	35 (0x23)
Domain ID Lock	Locked
Primary CPU	N/A - does not apply to this switch
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Switchover Timestamp	N/A - does not apply to this switch
Number Of Switchovers	N/A - does not apply to this switch
Number Of Ports	20
Operational State	Online
Administrative State	Online
Configured Admin State	Online
Beacon Status	Off

Alerts Panel

The Alerts Panel shows all reasons for status, including faults. The Alerts Panel entries are the highlighted rows between the faceplate image and the data window entries.

Note – The up/down arrows on the divider bar (between the Alerts Panel entries and data windows) enable you to move the divider bar up or down. With the faceplate image and data windows displayed, click the up arrow (on left) to move the divider up to the top of the window, thus completely hiding the faceplate image. Click the down arrow (on right) to move the divider back to the middle; click the down arrow again to completely hide the data window. You can also click-and-drag the divider bar to manually move it up or down.

FIGURE 1-14 Alerts Panel


Enterprise Fabric Suite 2007 - Faceplate
File Fabric Switch Port Zoning Security View Wizards Help
Add Open Save Refresh Events Zoning Security Help
Sun microsystems
Switch
Fabric 1
Switch 1
Switch 2
Switch 3
Switch 1
1
2
Devices Switch Port Stats Port Info Configured Zonesets Configured Security Active Security

Status | Thu Jun 28 10:21:42 CDT 2007 | Power Supply Failed

Field	Switch 1
Switch Type	FC Switch
First Port Address	230000
World Wide Name	10:00:00:c0:dd:06:f5:ce
Serial Number	0441A00261
Reason for Status	Power Supply Failed
Vendor	QLogic
MAC Address	00:c0:dd:06:fa:a5
Negotiated Domain ID	35 (0x23)
Configured Domain ID	35 (0x23)
Domain ID Lock	Locked
Primary CPU	N/A - does not apply to this switch
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Switchover Timestamp	N/A - does not apply to this switch
Number Of Switchovers	N/A - does not apply to this switch
Number Of Ports	20
Operational State	Online
Administrative State	Online
Configured Admin State	Online
Beacon Status	Off

Figure Legend

1	Alerts Panel Entries	**2**	Move Divider Arrows

Port Views and Status

Port color and text provide information about the port and its operational state. Green indicates active; gray indicates inactive. The faceplate display provides the following views of port status corresponding to the View menu options in the faceplate display. Refer to "Monitoring Port Status" on page 179 for more information about these displays.

- Port type
- Port state
- Port speed
- Port media

Working with Ports

Ports are selectable and serve as access points for other displays and menus. You select ports to display information about them in their respective data windows or to modify them. Context-sensitive popup menus and properties windows are accessible through the port icons.

Selecting Ports

Selected ports in the faceplate display are outlined in light-blue.

Note – When using the Shift key to select a range of ports, the first port you click in the range is the "anchor" selection. Subsequent ranges are based on this anchor selection. For example, after clicking port 4 and port 9 respectively, port 4 becomes the anchor selection. The next range includes all ports between port 4 and the next port you select.

You can select ports the following ways.

- To select a port, click the port.
- To un-select a port, click outside that port.
- To select all ports, right-click on the faceplate image and select Select All Ports from the popup menu.
- To select a range of consecutive ports, click a port, press the Shift key and click another port. The application selects both end ports and all ports in between the end ports.
- To select several non-consecutive ports, press the Control key while clicking each port.
- To un-select ports in a group of selected ports, press the Control key while clicking each port.

Faceplate Data Windows

The faceplate display provides the following data windows corresponding to the data window tabs:

- Devices — displays information about devices (hosts and storage targets) connected to the switch. Refer to “Devices Data Window” on page 40 for more information.
- Switch — displays current switch configuration data. Refer to “Switch Data Window” on page 109 for more information.

- Stack Links — displays information about the links between all switches in the stack.
- Port Statistics — displays performance data for the selected ports. Refer to "Port Statistics Data Window" on page 169 for more information.
- Port Information — displays information for the selected ports. Refer to "Port Information Data Window" on page 173 for more information.
- Configured Zonesets — displays all zone sets, zones, and zone membership in the zoning database. Refer to "Configured Zonesets Data Window" on page 59 for more information.
- Configured Security — displays all security definitions currently saved in the database. Refer to "Configured Security Data Window" on page 82 for more information.
- Active Security — displays the active security set. Refer to "Active Security Data Window" on page 83 for more information.

CHAPTER 2

Managing Fabrics

This section describes the following fabric management tasks:

Tracking Fabric Firmware and Software Versions

The Fabric Tracker option allows you to generate a snapshot or baseline of current system version information, which can be viewed, analyzed and compared to other snapshot files, and exported to a file. Information includes date and time, switch active firmware version, device hardware, drivers, and firmware version from FDMI.

The Snapshot Analyzer option allows you to:

- Compare two snapshots
- Detect mismatches of firmware and driver versions
- Detect devices that have been moved, added to or removed from the fabric.

Saving a Version Snapshot

To save the current snapshot to an XML file, do the following:

1. In the faceplate display, open the Fabric menu and select Fabric Tracker, and then select Save Snapshot.

2. Enter a filename.

3. Click the Save button to save the snapshot as an XML file.

Viewing and Comparing Version Snapshots

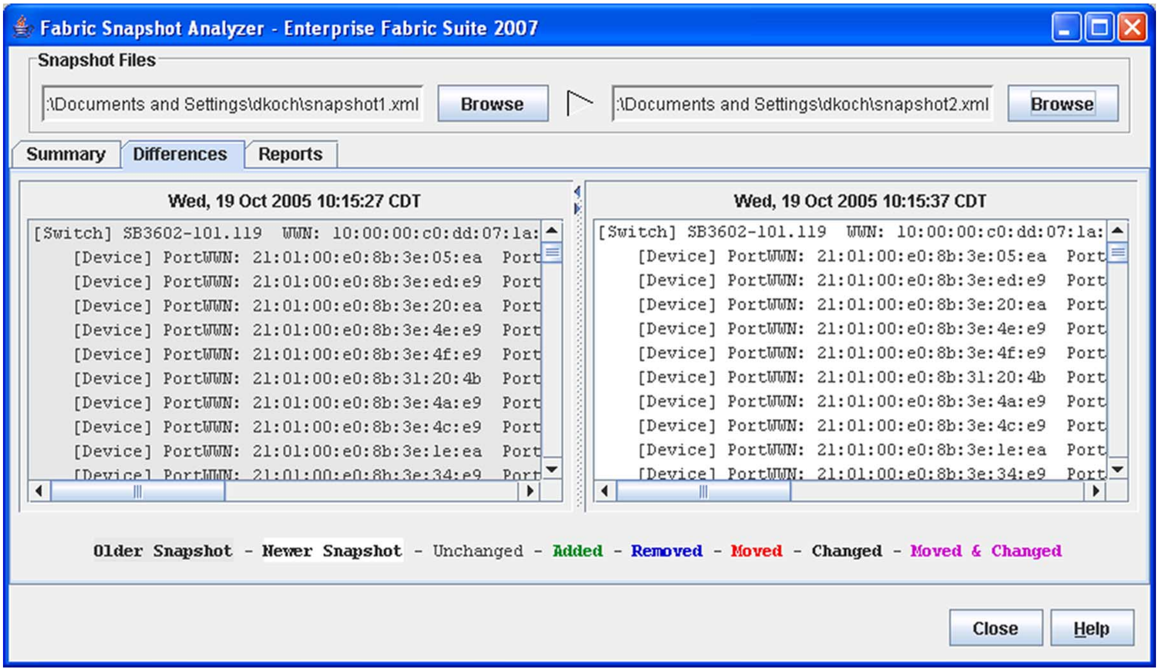
To view and analyze system version information, open the Fabric menu, select Fabric Tracker, and select Analyze Snapshots. The Fabric Version Snapshot Analysis dialog (FIGURE 2-1) opens with the Summary, Differences and Reports tab pages. Click the Browse buttons to open and view the snapshot files in the corresponding tab pages. Click the Close button to exit the Fabric Version Snapshot Analysis dialog. The color key below the scrollable area defines the meanings of the colors used. The Summary tab page shows a brief description of the changes that have occurred between the older snapshot and the newer one. Use the Summary tab page to quickly view what has changed. The Differences tab page shows a side-by-side comparison of two snapshots.

The timestamp of each snapshot is displayed above the scroll area showing that snapshot. The background color of the older snapshot is darker than the background of the newer snapshot. The arrow icon between the snapshot selectors always points from the older snapshot to the newer one. If the two snapshots have the same timestamp, the arrow will not be displayed. The scroll bars are synchronized to view the same portion of each snapshot file simultaneously. Click and drag the separator bar between the two panes to resize each pane. At the top of the separator bar between the two panes, click the left/right arrows to close the corresponding pane. The left/right arrows move to one side.

Exporting Version Snapshots to a File

The Reports tab page allows you to select one report to save to a text file. There are two types of reports. The Summary report type shows the same format displayed on the Summary tab page without the color highlighting. The Detail report type shows a detailed breakdown of the differences. Use the Export button to save the selected report to a text file.

FIGURE 2-1 Fabric Version Snapshot Analysis Dialog



Fabric Snapshot Analyzer - Enterprise Fabric Suite 2007

Snapshot Files

:\Documents and Settings\dkoch\snapshot1.xml

:\Documents and Settings\dkoch\snapshot2.xml

Wed, 19 Oct 2005 10:15:27 CDT

```
[Switch] SB3602-101.119  WWN: 10:00:00:c0:dd:07:1a:
    [Device] PortWWN: 21:01:00:e0:8b:3e:05:ea  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:ed:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:20:ea  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4e:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4f:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:31:20:4b  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4a:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4c:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:1e:ea  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:34:e9  Port
```

Wed, 19 Oct 2005 10:15:37 CDT

```
[Switch] SB3602-101.119  WWN: 10:00:00:c0:dd:07:1a:
    [Device] PortWWN: 21:01:00:e0:8b:3e:05:ea  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:ed:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:20:ea  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4e:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4f:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:31:20:4b  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4a:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:4c:e9  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:1e:ea  Port
    [Device] PortWWN: 21:01:00:e0:8b:3e:34:e9  Port
```

Browse
Browse
Summary
Differences
Reports
Older Snapshot - Newer Snapshot - Unchanged - Added - Removed - Moved - Changed - Moved & Changed
Close
Help

Managing the Fabric Database

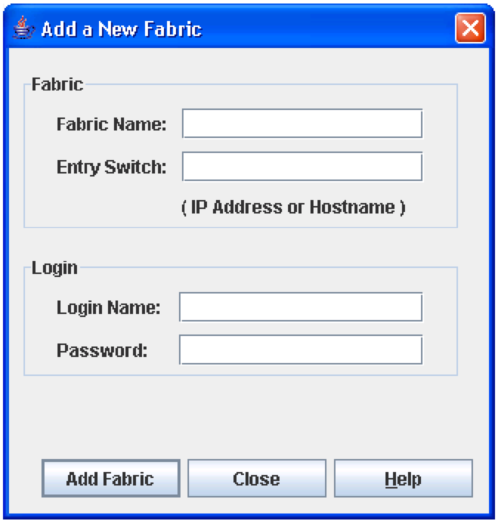
A fabric database contains the set of fabrics that you have added during an Enterprise Fabric Suite 2007 session. Initially, if you do not open an existing fabric or fabric view file, the Enterprise Fabric Suite 2007 application opens with an empty fabric database.

Adding a Fabric

To add a fabric to the database, do the following:

1. Open the Fabric menu and select Add Fabric to open the Add a New Fabric dialog (FIGURE 2-2).

FIGURE 2-2 Add a New Fabric Dialog



2. Enter a fabric name in the Fabric Name field. This step is optional.

Note – Assigning a fabric name is recommended. However, if you enter a fabric name, it must be unique.

---

3. In the Entry Switch field, enter the IP address or Domain Name Server (DNS) name of the switch through which to manage the fabric. Refer to "IPv4 and IPv6 Addressing" on page 138 for more information.

4. Enter an account name and password. The factory login name and password are "admin" and "password". The password is for the switch and is stored in the switch firmware. Refer to "Managing User Accounts" on page 104.

5. Click the Add Fabric button.

Note – A switch supports a combined maximum of 19 logins or sessions reserved as follows:

- 4 logins or sessions for internal applications such as management server and SNMP
- 9 high priority Telnet sessions
- 6 logins or sessions for Enterprise Fabric Suite 2007 inband and out-of-band logins, Application Programming Interface (API) inband and out-of-band logins, and Telnet logins. Additional logins will be refused.

---

6. For security reasons, you will be prompted (FIGURE 1-2) to change your user account password initially set up by the administrator. You will be prompted to change the password each time you attempt to open the fabric until you change the password. Click the OK button, and change the user account password. Refer to "Managing User Accounts" on page 104 for more information.

Note – If the entry switch has SSL (Secure Socket Layer) enabled, the switch will generate and display a Verify Certificate dialog that you must accept before gaining access to the fabric. Refer to "Connection Security" on page 80 and for more information on certificates and SSL.

Removing a Fabric

To delete a fabric from the database, do the following:

1. Select a fabric in the fabric tree.
2. Open the Fabric menu and select Remove Fabric.

Note – The Closing Sessions dialog is then displayed with the status of closing the fabric sessions. Click the OK button to close the dialog.

Opening a Fabric View File

A fabric view file is one or more fabrics saved to a file. To open an existing view file, do the following:

1. Open the File menu and select Open View File, or click the Open button. If the fabric you are currently viewing has changed, you will be prompted to save the changes to the fabric view file with the Save View dialog before opening a different view file.
2. In the Open View dialog, enter the name of the file to open, and enter a file password, if a password was entered when this fabric view file was saved.
3. Click the OK button.

Note – To maximize system performance and reduce the fabric event logs, limit the number of large fabrics open at one time.

Saving a Fabric View File

To save a fabric view file, do the following:

1. Open the File menu, and select Save View As.
2. In the Save View dialog, enter a new file name.
3. Enter a file password, if necessary.
4. Click the OK button.

Rediscovering a Fabric

The rediscover fabric option clears out the current fabric information being displayed, and rediscovers all switch information. To rediscover a fabric, open the Fabric menu, and select Rediscover Fabric. The rediscover function is more comprehensive than the refresh function.

Deleting Switches and Links

The Enterprise Fabric Suite 2007 application does not automatically delete switches or links that have failed or have been physically removed from the fabric Fibre Channel network. In these cases, you can delete switches and links to bring the display up to date. If you delete a switch or a link that is still active, the Enterprise Fabric Suite 2007 application will restore it automatically. You can also refresh the display. To delete a switch from the topology display, do the following:

1. Select a switch in the topology display.
2. Open the Switch menu and select Delete.

To delete a link, do the following:

1. Select a link in the topology display.
2. Right-click the link and select Delete from the popup menu.

Adding a New Switch to a Fabric

If there are no special conditions to be configured for the new switch, simply plug in the switch and the switch becomes functional with the default fabric configuration. The default fabric configuration settings are:

- Fabric zoning is sent to the switch from the fabric.
- All ports will be GL_Ports.
- The default IP address 10.0.0.1 is assigned to the switch without a gateway or boot protocol configured (RARP, BOOTP, and DHCP).

If you are adding a switch to a fabric and do not want to accept the default fabric configuration, do the following:

1. If the switch is not new from the factory, reset the switch to the factory configuration before adding the switch to the fabric by selecting Restore Factory Defaults in the Switch menu from the faceplate display.
2. If you want to manage the switch through the Ethernet port, you must first configure the IP address using the Network Properties dialog or the Configuration Wizard.
3. Configure any special switch settings. To open the Zoning Config dialog, open the Zoning menu, and select Edit Zoning Config.
4. Plug in the inter-switch links (ISL), but do not connect the devices.
5. Configure the port types for the new switch using the Port Properties dialog. The ports can be G_Port, GL_Port, F_Port, FL_Port, or Donor.
6. Connect the devices to the switch.
7. Make any necessary zoning changes using the Edit Zoning dialog. To open the Edit Zoning dialog, open the Zoning menu, and select Edit Zoning. To open the Zoning Config dialog, open the Zoning menu, and select Edit Zoning Config.

Replacing a Failed Switch

The archive/restore works for all switches. However, the Restore menu item is not available for the in-band switches. You can only restore a switch out-of-band (the fabric management switch). Enterprise Fabric Suite 2007 will archive and restore only the settings that can be configured with Enterprise Fabric Suite 2007. Refer to "Archiving a Switch" on page 130 and "Restoring a Switch" on page 131 for information about archive and restore. Use the following procedure to replace a failed switch for which an archive is available.

1. At the failed switch:
   a. Turn off the power and disconnect the AC power cords.
   b. Note port locations and remove the interconnection cables and SFPs.
   c. Remove the failed switch.

2. At the replacement switch:

   a. Mount the switch in the location where the failed switch was removed.

   b. Install the SFPs using the same ports as were used on the failed switch.

Caution – Do not reconnect inter-switch links, target devices, and initiator devices at this time. Doing so could invalidate the fabric zoning configuration.

---

   c. Attach the AC power cords and power up the switch.

3. Select the failed switch in the topology display. Open the Switch menu and select Delete.

4. Restore the configuration from the failed switch to the replacement switch:

   a. Open a new fabric to the replacement switch.

   b. Open the faceplate display for the replacement switch. Open the Switch menu and select Restore.

   c. In the Restore dialog, enter the archive file from the failed switch or browse for the file.

   d. Click the Restore button.

5. Reset the replacement switch to activate the configuration formerly possessed by the failed switch including the domain ID and the zoning database. Open the Switch menu and select Reset Switch.

6. Reconnect the inter-switch links, target devices, and initiator devices to the replacement switch using the same ports as were used on the failed switch.

Displaying Fabric Information

The topology display is your primary tool for monitoring a fabric. The graphic window of the topology display provides status information for switches, inter-switch links, and the Ethernet connection to the management workstation. Refer to Link data window (FIGURE 2-3) for more information.

The topology display data windows show device, active zone set, switch, and link information.

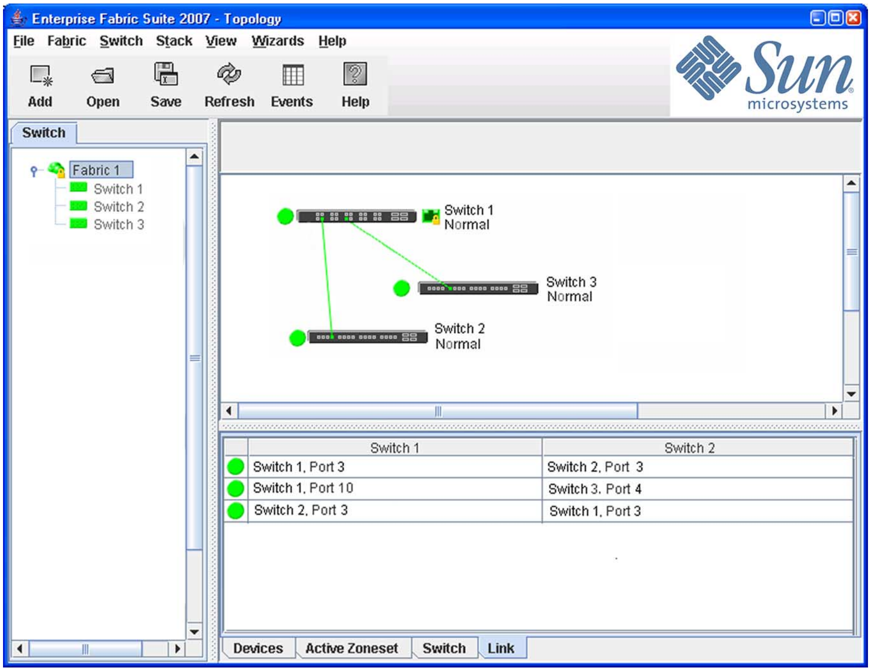
Refer to “Devices Data Window” on page 40 for information on devices in a fabric. Refer to “Active Zoneset Data Window” on page 58 for information on zone definitions for the active zone set. Refer to “Switch Data Window” on page 109 for information about the Name Server and Switch data windows. Refer to “Link and Stack Link Data Windows” on page 39 for information on switch links.

Link and Stack Link Data Windows

The Link data window (FIGURE 2-3) displays information about all switch links in the fabric or selected links in the topology display. This information includes the switch name, the port number at the end of each link, and the link status icon. To open the Link data window, click the Link tab below the data window in the topology display.

The Stack Links data window displays information about all switch links for a stack of switches in the faceplate display. This information includes the switch names, the port number at the end of each link, and the link status icon. To open the Stack Links data window, click a stack icon in the fabric tree, and click the Stack Links tab below the data window in the stack faceplate display.

FIGURE 2-3 Link Data Window

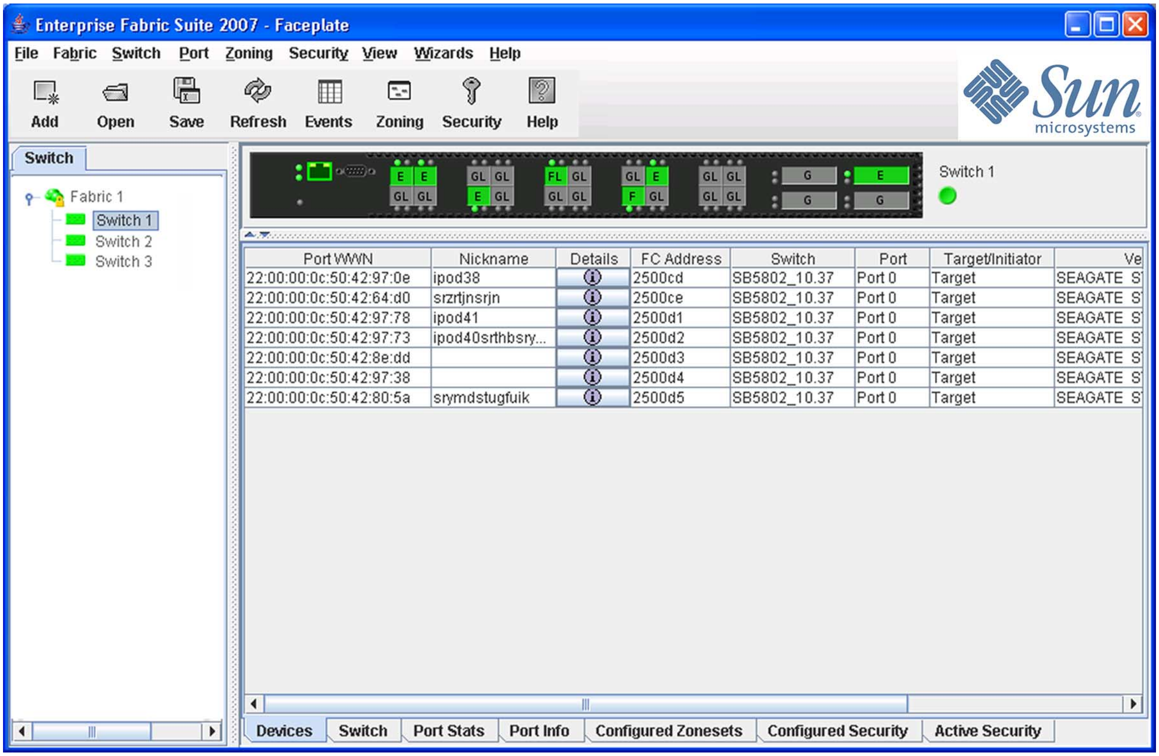

Enterprise Fabric Suite 2007 - Topology
File Fabric Switch Stack View Wizards Help
Add Open Save Refresh Events Help
Sun microsystems
Switch
Fabric 1
Switch 1
Switch 2
Switch 3
Switch 1
Normal
Switch 3
Normal
Switch 2
Normal
Devices Active Zoneset Switch Link

	Switch 1	Switch 2
●	Switch 1, Port 3	Switch 2, Port 3
●	Switch 1, Port 10	Switch 3, Port 4
●	Switch 2, Port 3	Switch 1, Port 3

Devices Data Window

The Devices data window (FIGURE 2-4) displays information about the devices that are logged into the fabric. Click the Devices tab below the data window to display device information for all devices that are logged into the selected fabric. To narrow the display to devices that are logged into specific switches, select one or more switches in the fabric tree or the topology display. Refer to "Exporting Device Information to a File" on page 50 for exporting device information.

FIGURE 2-4 Devices Data Window



Port WWN	Nickname	Details	FC Address	Switch	Port	Target/Initiator	Ve
22:00:00:0c:50:42:97:0e	ipod38	ⓘ	2500cd	SB5802_10.37	Port 0	Target	SEAGATE S
22:00:00:0c:50:42:64:d0	srzrtjnsrjn	ⓘ	2500ce	SB5802_10.37	Port 0	Target	SEAGATE S
22:00:00:0c:50:42:97:78	ipod41	ⓘ	2500d1	SB5802_10.37	Port 0	Target	SEAGATE S
22:00:00:0c:50:42:97:73	ipod40srthbsry...	ⓘ	2500d2	SB5802_10.37	Port 0	Target	SEAGATE S
22:00:00:0c:50:42:8e:dd		ⓘ	2500d3	SB5802_10.37	Port 0	Target	SEAGATE S
22:00:00:0c:50:42:97:38		ⓘ	2500d4	SB5802_10.37	Port 0	Target	SEAGATE S
22:00:00:0c:50:42:80:5a	srymdstugfuik	ⓘ	2500d5	SB5802_10.37	Port 0	Target	SEAGATE S

TABLE 2-1 describes the entries in the Devices data window.

TABLE 2-1 Devices Data Window Entries

Entry	Description
Port WWN	Port world wide name
Nickname	Device port nickname. To create a new nickname or edit an existing nickname, double-click the cell and enter a nickname in the Edit Nickname dialog. Refer to "Managing Nicknames for Fabric Devices" on page 50 for more information.
Details	Click the (i) to display additional information about the device. Refer to "Displaying Detailed Device Information" on page 49.
FC Address	Fibre Channel address
Switch	Switch name
Port	Switch port number
Target/Initiator	Device type: Target, Initiator, or Both
Vendor	Host Bus Adapter/Device Vendor
Active Zones	The active zone to which the device belongs
Row #	Row number reference for each listing in the Devices data window table

Displaying Fabric Status

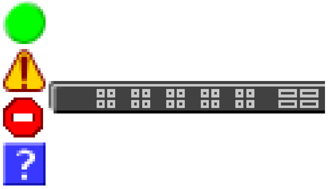
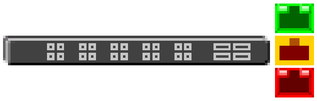
The fabric updates the topology and faceplate displays by forwarding changes in status to the management workstation as they occur. You can allow the fabric to update the display status, or you can refresh the display at any time. To refresh the topology display, do one of the following:

- Click the Refresh button.
- Open the View menu and select Refresh.
- Press the F5 key.
- Right-click anywhere in the background of the topology display and select Refresh Fabric from the popup menu.

The topology display uses switch and status icons to provide status information about switches, inter-switch links, and the Ethernet connection. The switch status icons, displayed on the left side of a switch, vary in shape and color. Switches controlled by an Ethernet Internet Protocol have a colored Ethernet icon displayed on the right side of the switch. A green Ethernet icon indicates normal operation, yellow indicates a condition that may require attention to maintain maximum performance, and red indicates a potential failure. TABLE 2-2 shows the different switch icons and their meanings.

Note – Enterprise Fabric Suite 2007 may not support all firmware versions. If the version of Enterprise Fabric Suite 2007 was not intended to support the firmware version on the switch, a warning status of "FW/GUI mismatch" is displayed for the switch. A switch with this status will still be manageable, but may preclude some operations from being performed.

TABLE 2-2 Topology Display Switch and Status Icons

Switch Icon	Description
	Switch status icons • Normal operation (green) • Warning–operational with errors (yellow) • Critical–potential failure (red) • Unknown–communication status unknown, unreachable, or unmanageable (blue)
	Fabric management switch Ethernet icons • Ethernet connection normal (green) • Ethernet connection warning (yellow) • Ethernet connection critical (red)
	Switch is not manageable with this version of Enterprise Fabric Suite 2007. Use the management application that was shipped with this switch.

Displaying the Event Browser

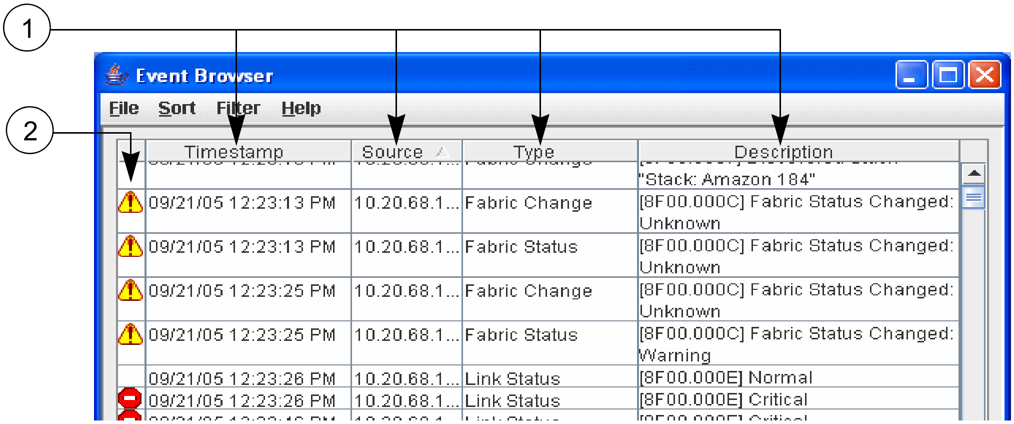
The Event Browser (FIGURE 2-5) displays a list of events generated by the switches in the fabric and the Enterprise Fabric Suite 2007 application. Events that are generated by the Enterprise Fabric Suite 2007 application are not saved on the switch, but can be saved to a file during the Enterprise Fabric Suite 2007 session.

Entries in the Event Browser are formatted by severity, time stamp, source, type, and description. The maximum number of entries allowed in the Event Browser is 10,000. The maximum number of entries allowed on a switch is 1200. Once the maximum is reached, the event list wraps and the oldest events are discarded and replaced with the new events. Event entries from the switch, use the switch time stamp, while event entries generated by the application have a workstation time stamp. You can filter, sort, and export the contents of the Event Browser to a file. The Event Browser begins recording when enabled and Enterprise Fabric Suite 2007 is running.

If the Event Browser is enabled using the Preferences dialog, the next time Enterprise Fabric Suite 2007 is started all events from the switch log will be displayed. If the Event Browser is disabled when Enterprise Fabric Suite 2007 is started and later enabled, only those events from the time the Event Browser was enabled and forward will be displayed.

To display the Event Browser, open the Fabric menu and select Show Event Browser, or click the Events button on the tool bar. If the Show Event Browser selection or the Events button is grayed-out, you must first enable the Events Browser setting in the Preferences dialog. Refer to "Setting Enterprise Fabric Suite 2007 Preferences" on page 9.

FIGURE 2-5 Events Browser



	Timestamp	Source	Type	Description
				"Stack: Amazon 184"
⚠	09/21/05 12:23:13 PM	10.20.68.1...	Fabric Change	[8F00.000C] Fabric Status Changed: Unknown
⚠	09/21/05 12:23:13 PM	10.20.68.1...	Fabric Status	[8F00.000C] Fabric Status Changed: Unknown
⚠	09/21/05 12:23:25 PM	10.20.68.1...	Fabric Change	[8F00.000C] Fabric Status Changed: Unknown
⚠	09/21/05 12:23:25 PM	10.20.68.1...	Fabric Status	[8F00.000C] Fabric Status Changed: Warning
	09/21/05 12:23:26 PM	10.20.68.1...	Link Status	[8F00.000E] Normal
⛔	09/21/05 12:23:26 PM	10.20.68.1...	Link Status	[8F00.000E] Critical

Figure Legend

1	Column Sorting Buttons	**2**	Severity Columns

Severity is indicated in the severity column using icons as described in TABLE 2-3.

TABLE 2-3 Severity Levels

Severity Icon	Description
◈	Alarm — a "serviceable event". This means that attention by the user or field service is required. Alarms are posted asynchronously to the screen and cannot be turned off. If the alarm denotes that a system error has occurred the customer and/or field representative will generally be directed to provide a "show support" capture of the switch.
⛔	Critical event — an event that indicates a potential failure. Critical log messages are events that warrant notice by the user. By default, these log messages will be posted to the screen. Critical log messages do not have alarm status as they require no immediate attention from a user or service representative.
⚠	Warning event — an event that indicates errors or other conditions that may require attention to maintain maximum performance. Warning messages will not be posted to the screen unless the log is configured to do so. Warning messages are not disruptive and, therefore, do not meet the criteria of Critical. The user need not be informed asynchronously
No icon	Informative — an unclassified event that provides supporting information.

Note – Events (Alarms, Critical, Warning, and Informative) generated by the application are not saved on the switch. They are permanently discarded when you close a Enterprise Fabric Suite 2007 session, but you can save these events to a file on the workstation before you close Enterprise Fabric Suite 2007 and read it later with a text editor or browser.

Note – Events generated by the switch are stored on the switch, and will be retrieved when the application is restarted. Some alarms are configurable. Refer to "Configuring Port Threshold Alarms" on page 116.

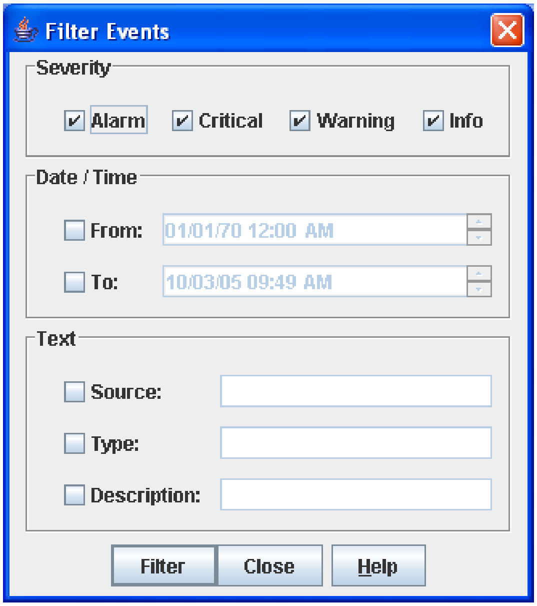
Filtering the Event Browser

Filtering the Event Browser allows you to display only those events that are of interest based on the event severity, timestamp, source, type, and description. To filter the Event Browser, open the Filter menu and select Filter Entries. This opens the Filter Events dialog (FIGURE 2-6). The Event Browser displays those events that meet all of the criteria in the Filter Events dialog. If the filtering criteria is cleared or changed, then all the events that were previously hidden that satisfy the new criteria will be shown.

You can filter the event browser in the following ways:

- Severity — select one or more of the corresponding options to display alarm events, critical events, warning events, or informative events.
- Date/Time — select one or both of the From: and To: options. Enter the bounding timestamps (MM/DD/YY HH:MM AA) to display only those events that fall within those times. ("AA" indicates AM or PM.) The current year (YY) can be entered as either 2 or 4 digits. For example, 12/12/07 will be interpreted December 12, 2007.
- Text — select one or more of the corresponding options and enter a text string (case sensitive) for event source, type, and description. The Event Browser displays only those events that satisfy all of the search specifications for the Source, Type, and Description text.

FIGURE 2-6 Filter Events Dialog



Filter Events

Severity

☑ Alarm ☑ Critical ☑ Warning ☑ Info

Date / Time

□ From: 01/01/70 12:00 AM

□ To: 10/03/05 09:49 AM

Text

□ Source:

□ Type:

□ Description:

Sorting the Event Browser

Sorting the Event Browser allows you to display the events in alphanumeric order based on the event severity, timestamp, source, type, or description. Initially, the Event Browser is sorted in ascending order by timestamp. To sort the Event Browser, click the Severity, Timestamp, Source, Type, or Description column headings. You can also open the Sort menu and select By Severity, By Timestamp, By Source, By Type, or By Description. Successive sort operations of the same type alternate between ascending and descending order

---

Note – We recommend using unique fabric names and switch symbolic names to better identify event log entries by source.

Saving the Event Browser to a File

You can save the displayed Event Browser entries to a file. Filtering affects the save operation, because only displayed events are saved. To save the Event Browser to a file, do the following:

1. Filter and sort the Event Browser to obtain the desired display.
2. Open the File menu and select Save As.
3. Select a folder and enter a file name in which to save the event log and click the Save button. The file can be saved in XML, CSV, or text format. XML files can be opened with an internet browser or text editor. CSV files can be opened with most spreadsheet applications.

Verifying Fibre Channel Connections

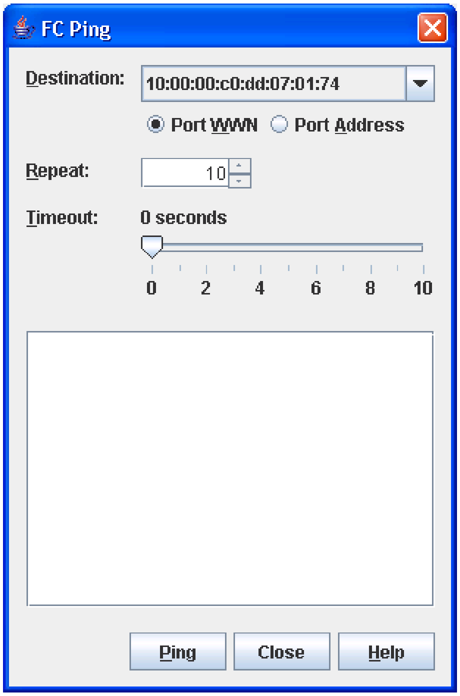
Testing and tracing FC connections consists of utilizing the FC Ping and FC TraceRoute dialogs to time and track frames from specified targets and destinations.

FC Ping Dialog

The FC Ping dialog (FIGURE 2-7) allows you to send an ECHO frame to a specified target and verify the frame was returned.

Note – The SANdoctor™ license key for Sun Storage Fibre Channel Switch 5802 is required to enable this feature. Contact your switch distributor or authorized reseller for information on purchasing the SANdoctor license key.

FIGURE 2-7 FC Ping Dialog



Destination: 10:00:00:c0:dd:07:01:74

● Port WWN ○ Port Address

Repeat: 10

Timeout: 0 seconds

To verify a Fibre Channel connection, do the following:

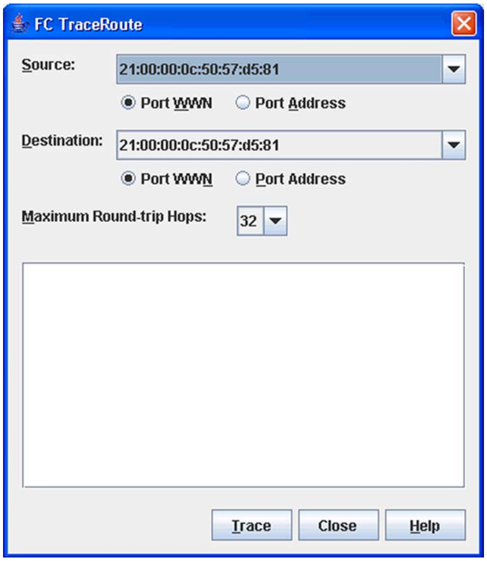
1. Open the Switch menu and select FC Ping to open the FC Ping dialog.
2. Open the Destination drop-down list and select a destination port.
3. Select the Port WWN or Port Address option.
4. In the Repeat area, use the arrow keys to select or type in a value (between 1-100) for the number of FC ping attempts to perform.
5. In the Timeout area, select the number of seconds to continue attempting the FC ping operation before timing out. Click and drag the slide bar to move the slide bar.
6. Click the Ping button, and view the results in the text window.

FC TraceRoute Dialog

The FC TraceRoute dialog (FIGURE 2-8) allows you to map the route trip a frame takes from source to destination and back.

Note – The SANdoctor license key is required to enable this feature. The FC TraceRoute option is displayed in the Fabric menu on all switches in a fabric if at least one switch in the fabric has a SANdoctor license. However, the FC TraceRoute option is only functional on switches that have the SANdoctor license. Contact your switch distributor or authorized reseller for information on purchasing the SANdoctor license key.

FIGURE 2-8 FC TraceRoute Dialog



Source: 21:00:00:0c:50:57:d5:81

● Port WWN ○ Port Address

Destination: 21:00:00:0c:50:57:d5:81

● Port WWN ○ Port Address

Maximum Round-trip Hops: 32

To trace a Fibre Channel connection, do the following:

1. Open the Fabric menu and select FC TraceRoute to open the FC TraceRoute dialog.
2. Open the Source drop-down list and select a source port.
3. Select the Port WWN or Port Address option.
4. Open the Destination drop-down list and select a destination port.
5. Select the Port WWN or Port Address option.
6. In the Maximum Round-trip Hops list, use the arrow keys to select or type in a value (between 1-32).
7. Click the Trace button, and view the results in the text window.

Working with Device Information and Nicknames

Enterprise Fabric Suite 2007 provides for the following:

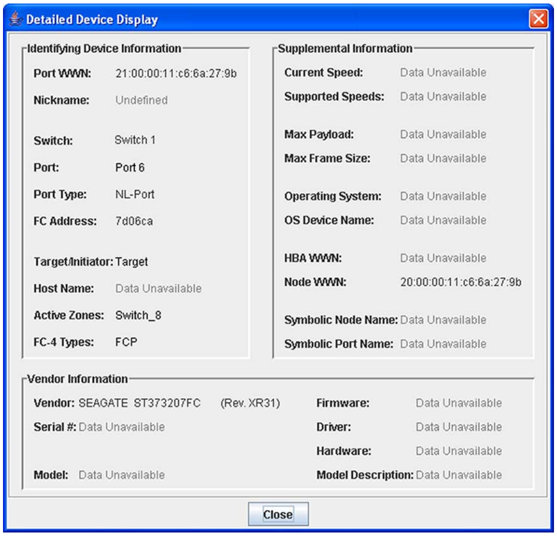
- Displaying Detailed Device Information
- Exporting Device Information to a File
- Managing Nicknames for Fabric Devices

Displaying Detailed Device Information

In addition to the information that is available in the Devices data window, you can click the **(i)** in the Details column to display more information in the Detailed Device Display dialog (FIGURE 2-9).

Note – The Detailed Device Display dialog shows detailed information for HBAs configured for FDMI. If the HBA is not configured for FDMI, supplemental and vendor information in the Detailed Device Display dialog is listed as "Undefined" or "Data Unavailable". Contact your HBA representative for more information on configuring your HBA for FDMI.

FIGURE 2-9 Detailed Devices Display Dialog



Detailed Device Display

Identifying Device Information

Port WWN: 21:00:00:11:c6:6a:27:9b

Nickname: Undefined

Switch: Switch 1

Port: Port 6

Port Type: NL-Port

FC Address: 7d06ca

Target/Initiator: Target

Host Name: Data Unavailable

Active Zones: Switch_8

FC-4 Types: FCP

Supplemental Information

Current Speed: Data Unavailable

Supported Speeds: Data Unavailable

Max Payload: Data Unavailable

Max Frame Size: Data Unavailable

Operating System: Data Unavailable

OS Device Name: Data Unavailable

HBA WWN: Data Unavailable

Node WWN: 20:00:00:11:c6:6a:27:9b

Symbolic Node Name: Data Unavailable

Symbolic Port Name: Data Unavailable

Vendor Information

Vendor: SEAGATE ST373207FC (Rev. XR31)

Serial #: Data Unavailable

Model: Data Unavailable

Firmware: Data Unavailable

Driver: Data Unavailable

Hardware: Data Unavailable

Model Description: Data Unavailable

Exporting Device Information to a File

To save device information to a file, open the topology display and do the following:

1. Select one or more switches in the graphic window. If no switches are selected, Devices information is gathered for all switches.

2. Open the Switch menu and select Export Devices.

3. In the Save dialog, enter a file name. Select the extension for the type of output file (CSV or text format) to be saved. CSV files can be opened with Microsoft Excel or most spreadsheet applications.

4. Click the Save button.

Managing Nicknames for Fabric Devices

A nickname is a user-definable, meaningful name that can be used in place of the world wide name. You can assign a nickname to a world wide name of a device. Assigning a nickname makes it easier to recognize device ports when zoning your fabric or when viewing the Devices data window. You can add, edit, delete, import and export nicknames using the Nicknames dialog. A nickname must start with a letter and can have up to 64 characters. Valid characters include alphanumeric characters [aA-zZ][0-9] and special symbols [$ _ - ^].

Note – Nicknames are stored on switches with firmware 6.6 and later. However, with 5.x firmware, nicknames are stored in an XML file on the workstation. To use nicknames stored on a workstation with 5.x firmware, you must import the 5.x nicknames XML file and save the changes. The maximum number of nicknames allowed is 5000.

Creating a Nickname

To create a device port nickname, do the following:

1. Open the Fabric menu and select Nicknames to open the Nicknames dialog. The device entries are listed in table format.

2. Choose one of the following methods to enter a nickname:
    - Double-click a cell in the Nicknames column, and enter a new nickname in the text field. Click the Apply button to save the changes and open the Save Nicknames dialog.

- Click on a device in the table. Open the Edit menu and select Create Nickname to open the Add Nickname dialog. In the Add Nickname dialog, enter a nickname and WWN and click the OK button.

Editing a Nickname

A nickname must start with a letter and can have up to 64 characters. Valid characters include alphanumeric characters [aA-zZ][0-9] and special symbols [$ _ - ^].

In the topology or faceplate display, open the Fabric menu and select Nicknames to open the Nicknames dialog. The device entries are listed in table format. Choose one of the following methods to edit a nickname:

- Double-click a cell in the Nicknames column, and edit the nickname in the text field. In the Nicknames dialog, click the Apply button to open the Save Nicknames dialog.
- Click on a device entry in the table. Open the Edit menu and select Edit Nickname to open the Edit Nicknames dialog. Edit the nickname in the text field, and click the OK button. In the Nicknames dialog, click the Apply button to save the changes.

Deleting a Nickname

To delete a device port nickname, do the following:

1. Open the Fabric menu and select Nicknames to open the Nicknames dialog.
2. Choose one of the following:
   - Click a device in the table. Open the Edit menu and select Delete Nickname.
   - Double-click a cell in the Nicknames column, and delete the nickname text.
3. Click the Apply button to open the Save Nicknames dialog.

Exporting Nicknames to a File

You can save nicknames to a file. This is useful for retaining nicknames of devices moved to another fabric. To save nicknames to an XML file, do the following:

1. Open the Fabric menu and select Nicknames to open the Nicknames dialog.
2. Open the File menu in the Nicknames dialog, and select Export.
3. Enter a name for the XML nickname file in the Save dialog and click Save.

Importing a Nicknames File

Importing a nicknames file merges (adds) the contents to the existing nicknames file used by Enterprise Fabric Suite 2007. This is useful for when retaining nicknames for devices moved to another fabric. To import a nickname file, do the following:

1. Open the Fabric menu and select Nicknames to open the Nicknames dialog.
2. Open the File menu in the Nicknames dialog, and select Import.
3. Select a nickname file in the Open dialog and click Open. When prompted to overwrite existing nicknames, click Yes.
4. Click the Apply button to open the Save Nicknames dialog.
5. Click the Save button to save the nicknames file to the switches in the fabric.

Enabling Fabric Services

Fabric services includes SNMP and in-band management. Simple Network Management Protocol (SNMP) is the protocol governing network management and monitoring of network devices. SNMP security consists of a read community string and a write community string, that are basically the passwords that control read and write access to the switch. The read community string ("public") and write community string ("private") are set at the factory to these well-known defaults and should be changed if SNMP is enabled using the System Services or SNMP Properties dialogs. If SNMP is enabled (default) and the read and write community strings have not been changed from their defaults, you risk unwanted access to the switch. Refer to "Enabling SNMP Configuration" on page 53 for more information. SNMP is enabled by default.

In-band management is the ability to manage switches across inter-switch links using Enterprise Fabric Suite 2007, SNMP, management server, or the application programming interface. The switch comes from the factory with in-band management enabled. If you disable in-band management on a particular switch, you can no longer communicate with that switch by means other than a direct Ethernet or serial connection. Refer to "Enabling In-band Management" on page 53 for more information.

Enabling SNMP Configuration

To enable SNMP configuration, do the following:

1. Choose one of the following:
   - On the faceplate display, open the Switch menu and select SNMP Properties to open the SNMP Properties dialog. In the SNMP Configuration area, select the SNMP Enabled option.
   - On the faceplate display, open the Switch menu and select Services to open the System Services dialog. Select the SNMP option.
2. Click the OK button to save the change.

Enabling In-band Management

To enable In-band Management, do the following:

1. On the faceplate display, open the Switch menu and select Switch Properties to open the Switch Properties dialog.
2. Select the In-band Management Enable option.
3. Click the OK button to save the change to the switch.

CHAPTER 3

Managing Fabric Zoning

This section consists of zoning concepts and tasks.

Zoning Concepts

The following zoning concepts provide some context for the zoning tasks described in this section:

- Zones
- Aliases
- Zone Sets
- Zoning Database
- Active Zoneset Data Window
- Configured Zonesets Data Window

Zones

Zoning divides the fabric for purposes of controlling discovery and inbound traffic. A zone is a named group of ports or devices. Members of the same zone can communicate with each other and transmit outside the zone, but cannot receive inbound traffic from outside the zone. A port/device can be a member of up to eight zones whose combined membership does not exceed 64.

Zoning is hardware enforced on a switch port if the sum of the logged-in devices plus the devices zoned with devices on that port is 64 or less. If a port exceeds this sum, that port behaves as a soft zone member. The port continues to behave as a soft zone member until the sum of logged-in and zoned devices falls back to 64, and the port is reset.

A zone can be a component of more than one zone set. Several zone sets can be defined for a fabric, but only one zone set can be active at one time. The active zone set determines the current fabric zoning.

Membership in a zone can be defined by switch domain ID and port number, device Fibre Channel address (FCID), or device world wide name (WWN).

- WWN entries define zone membership by the world wide name of the attached device. With this membership method, you can move WWN member devices to different switch ports in different zones without having to edit the member entry as you would with a domain ID/port number member. Furthermore, unlike FCID members, WWN zone members are not affected by changes in the fabric that could change the Fibre Channel address of an attached device.
- FCID entries define zone membership by the Fibre Channel address of the attached device. With this membership method you can replace a device on the same port without having to edit the member entry as you would with a WWN member.
- Domain ID/Port number entries define zone membership by switch domain ID and port number. All devices attached to the specified port become members of the zone. The specified port must be an F_Port or an FL_Port.

Aliases

To make it easier to add a group of ports or devices to one or more zones, you can create an alias. An alias is a named set of ports or devices that are grouped together for convenience. Unlike zones, aliases impose no communication restrictions between its members. You can add an alias to one or more zones. However, you cannot add a zone to an alias, nor can an alias be a member of another alias.

Zone Sets

A zone set is a named group of zones. A zone can be a member of more than one zone set. Each switch in the fabric maintains its own zoning database containing one or more zone sets. This zoning database resides in non-volatile (permanent) memory and is therefore retained after a reset. Refer to "Configured Zonesets Data Window" on page 59 for information about displaying the zoning database.

Note – Zones that are currently not in a zone set are considered to be part of the "orphan zone set". The orphan zone set is not an actual zone set, but rather a way of displaying the zones that are not currently in a zone set.

To apply zoning to a fabric, choose a zone set and activate it. When you activate a zone set, the switch distributes that zone set and its zones, excluding aliases, to every switch in the fabric. (However, the contents of the aliases are distributed.) This zone set is known as the active zone set. Only one zone set can be active at one time. Refer to "Active Zoneset Data Window" on page 59 for information about displaying the active zone set.

Zoning Database

Each switch has its own zoning database. The zoning database is made up of all aliases, zones, and zone sets that have been created on the switch or received from other switches. The switch maintains two copies of the inactive zoning database: one copy is maintained in temporary memory for editing purposes; the second copy is maintained in permanent memory. Zoning database edits are made on an individual switch basis and are not propagated to other switches in the fabric when saved.

The Auto Save parameter determines whether changes to the active zone set that a switch receives from another switch in the fabric will be saved to permanent memory on that switch. Refer to "Configuring the Zoning Database" on page 65 for information about zoning configuration.

Viewing Zoning Limits and Properties

The switch zoning limits are:

- **MaxZoneSets is 256**. The maximum number of zone sets that can be configured on the switch.
- **MaxZones is 2000.** The maximum number of zones that can be configured on the switch, including orphan zones.
- **MaxAliases is 2500.** The maximum number of aliases that can be configured on the switch.
- **MaxTotalMembers is 10,000.** The maximum number of zone and alias members that can be stored in the switch's zoning database. Each instance of a zone member or alias member counts toward this maximum.
- **MaxZonesInZoneSets is 2000**. The maximum number of zone linkages to zonesets that can be configured on the switch. Every time a zone is added to a zoneset this constitutes a linkage.
- **MaxMembersPerZone is 2000**. The maximum number of zone members that can be added to any zone on the switch. Aliases are considered zone members when added to a zone.
- **MaxMembersPerAlias is 2000**. The maximum number of zone members that can be added to any alias on the switch.

To view zoning properties and limits on a switch, do the following:

1. On the faceplate display, open the Zoning menu and select Edit Zoning or click the Zoning button to open the Edit Zoning dialog.
2. Choose one of the following:
   - The zoning properties/limits are displayed under the zoning toolbar (FIGURE 3-3).
   - In the zone sets tree (left window pane), right-click the top zone sets entry, a zone, or an alias. Open the Edit menu and select Properties.
   - In the zone set tree (left window pane), select the top zone sets entry, a zone, or an alias. Open the Edit menu and select Properties.
3. View the zoning limits and properties information in the Properties dialog.
4. Click the OK button to close the Properties dialog.

Active Zoneset Data Window

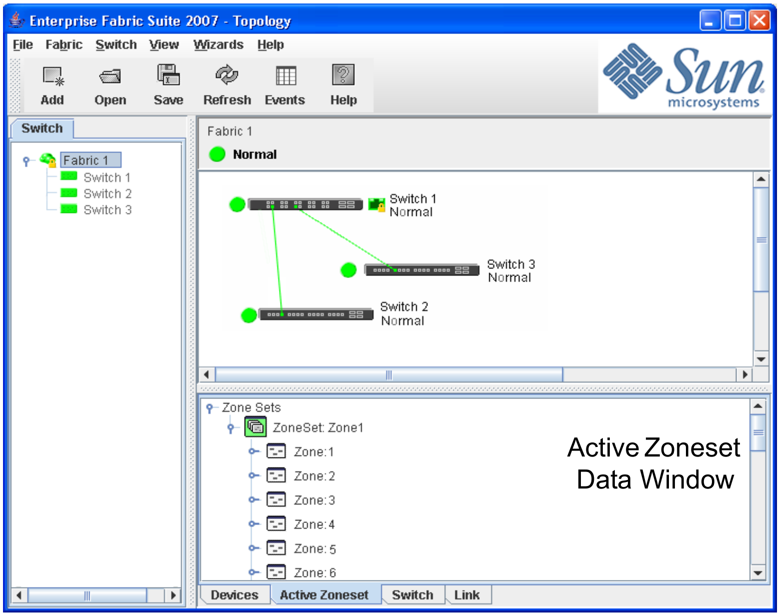
The Active Zoneset data window (FIGURE 3-1) displays the zone membership for the active zone set that resides on the fabric management switch. The active zone set is the same on all switches in the fabric – you can confirm this by adding a fabric through another switch and comparing Active Zone Set displays.

To open the Active Zoneset data window, click the Active Zoneset tab below the data window in the topology display. Refer to "Zoning a Fabric" on page 60 for more information about zone sets and zones.

The Active Zoneset data window (FIGURE 3-1) uses display conventions for expanding and contracting entries that are similar to the fabric tree. An entry handle located to the left of an entry in the tree indicates that the entry can be expanded. Click this handle or double-click the following entries:

- A zone set entry expands to show its member zones.
- A zone entry expands to show its member ports/devices.
- Ports/devices that are zoned by WWN or FC address, but no longer part of the fabric, are grayed-out.

FIGURE 3-1 Active Zoneset Data Window



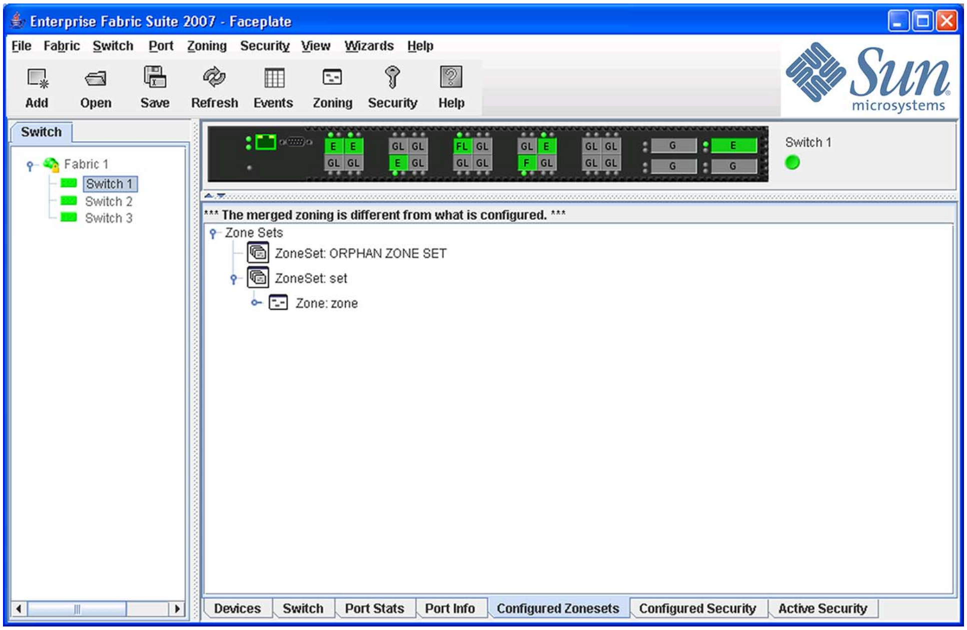
Configured Zonesets Data Window

The Configured Zonesets data window (FIGURE 3-2) displays all zone sets, zones, aliases, and zone membership in the zoning database. To open the Configured Zonesets data window, click the Configured Zonesets tab below the data window in the faceplate display.

The Configured Zonesets data window uses display conventions for expanding and contracting entries that are similar to the fabric tree. An entry handle located to the left of an entry in the tree indicates that the entry can be expanded. Click this handle or double-click the following entries to expand or collapse them:

- A zone set entry expands to show its member zones.
- A zone entry expands to show its members by domain ID and port number, device port world wide name, or device port Fibre Channel address.
- The alias entry expands to show its entries.

FIGURE 3-2 Configured Zonesets Data Window



- Fabric 1
  - Switch 1
  - Switch 2
  - Switch 3

*** The merged zoning is different from what is configured. ***

- Zone Sets
  - ZoneSet: ORPHAN ZONE SET
  - ZoneSet: set
    - Zone: zone

Zoning a Fabric

Zoning allows you to divide the ports and devices of the fabric into zones for more efficient and secure communication among functionally grouped nodes. This subsection addresses the following topics:

- Using the Zoning Wizard
- Managing the Zoning Database
- Managing Zone Sets
- Managing Zones
- Managing Aliases
- Merging Fabrics and Zoning

Using the Zoning Wizard

The Zoning Wizard is a series of dialogs that leads you through the process of zoning a fabric. To open the Zoning Wizard, open the Wizards menu in the faceplate display, and select Zoning Wizard.

The Zoning Wizard helps you zone the two most typical reasons for zoning:

- Zoning Windows servers storage
- Assign storage to servers.

To solve these problems, there must be at least one target and at least one initiator in the name server. Windows servers do not share devices well, but sometimes they must share devices, such as a tape drive. The wizard helps you define which devices are sharable and which ones are not. Once a device is in a Windows group, it can no longer be in any other group.

Managing the Zoning Database

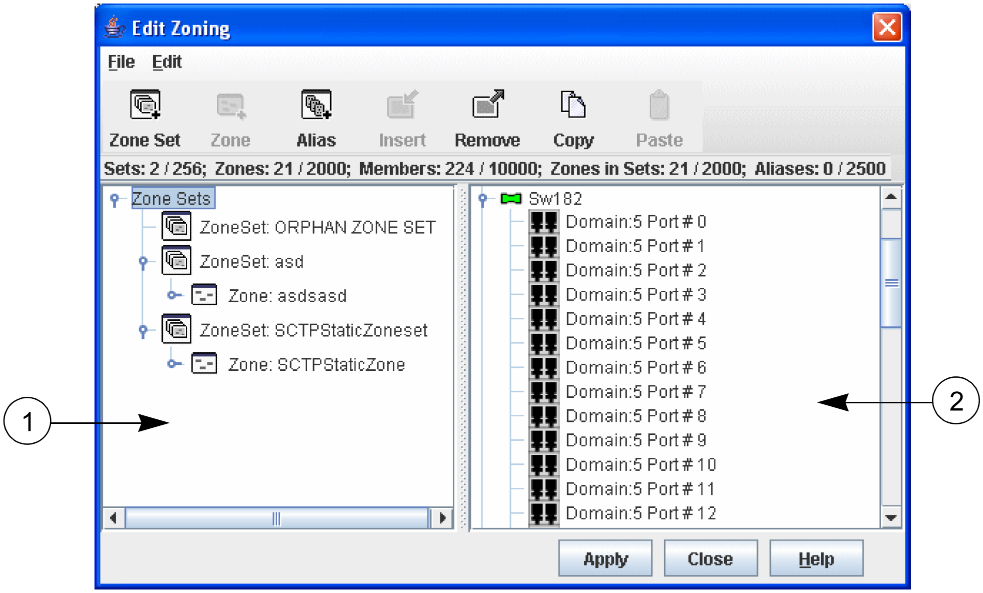
Managing the zoning database consists of the following:

- Editing the Zoning Database
- Configuring the Zoning Database
- Resolving Zoning
- Saving the Zoning Database to a File
- Restoring the Zoning Database from a File
- Restoring the Default Zoning Database
- Removing All Zoning Definitions

Editing the Zoning Database

To edit the zoning database for a particular switch, open the Zoning menu from the faceplate display and select Edit Zoning to open the Edit Zoning dialog (FIGURE 3-3). Changes can only be made to inactive zone sets, which are stored in flash (non-volatile) memory and retained after resetting a switch.

FIGURE 3-3 Edit Zoning Dialog



Sets: 2 / 256; Zones: 21 / 2000; Members: 224 / 10000; Zones in Sets: 21 / 2000; Aliases: 0 / 2500

- Zone Sets
  - ZoneSet: ORPHAN ZONE SET
  - ZoneSet: asd
    - Zone: asdsasd
  - ZoneSet: SCTPStaticZoneset
    - Zone: SCTPStaticZone

- Sw182
  - Domain:5 Port # 0
  - Domain:5 Port # 1
  - Domain:5 Port # 2
  - Domain:5 Port # 3
  - Domain:5 Port # 4
  - Domain:5 Port # 5
  - Domain:5 Port # 6
  - Domain:5 Port # 7
  - Domain:5 Port # 8
  - Domain:5 Port # 9
  - Domain:5 Port # 10
  - Domain:5 Port # 11
  - Domain:5 Port # 12

Figure Legend

1	Zone Sets Tree	**2**	Port/Device Tree

To apply zoning to a fabric, choose a zone set and activate it. When you activate a zone set, the switch distributes that zone set and its zones, excluding aliases, to every switch in the fabric. This zone set is known as the active zone set.

You can not edit an active zone set on a switch. You must configure an inactive zone set to your needs and then activate that updated zone set to apply the changes to the fabric. When you activate a zone set, the switch distributes that zone set to the temporary zoning database on every switch in the fabric. However, in addition to the merged active zone set, each switch maintains its own original zone set in its zoning database. Only one zone set can be active at one time.

Note – If the Merge Auto Save parameter is enabled on the Zoning Configuration dialog, then every time the active zone set changes, the switch will copy it into an inactive zone set stored on the switch. You can edit this copy of the active zone set stored on the switch, and activate the updated copy to conveniently apply the changes to the active zone set. The edited copy then becomes the active zone set.

The Edit Zoning dialog has a Zone Sets tree on the left and a Port/Device (or members) tree on the right. Both trees use display conventions similar to the fabric tree for expanding and contracting zone sets, zones, and ports. An expanded port shows the port Fibre Channel address; an expanded address shows the port world wide name. You can select zone sets, zones, and ports in the following ways:

- Click a zone, zone set, or port icon.
- Right-click to select a zone set or zone, and open the corresponding popup menu.
- Press the Shift key while clicking several consecutive icons.
- Press the Control key while clicking several non-consecutive icons.

Using tool bar buttons, popup menus, or a drag-and-drop method, you can create and manage zone sets and zones in the zoning database. TABLE 3-1 describes the zoning tool bar operations.

Use the Edit Zoning dialog to define zoning changes, and click the Apply button to open the Save Zoning & Error Check dialog. Click the Perform Error Check button to have Enterprise Fabric Suite 2007 check for zoning conflicts, such as empty zones, aliases, or zone sets, and ACL zones with non-domain ID/port number membership. Click the Save Zoning button to open the Zone Set Activation dialog. Click the Yes button to activate the zoneset after saving the changes, or click the No button to not activate the zoneset after saving the changes. Click the Close button to close the Save Zoning & Error Check dialog. On the Edit Zoning dialog, click the Close button to close the Edit Zoning dialog.

TABLE 3-1 Edit Zoning Dialog Tool Bar Buttons and Icons

Button/Icon	Description
Zone Set	Create Zone Set button – create a new zone set
Zone	Create Zone button – create a new zone
Alias	Create Alias button – create another name for a set of objects
Insert	Add Member button – adds selected port/device to a zone

TABLE 3-1 Edit Zoning Dialog Tool Bar Buttons and Icons *(Continued)*

Button/Icon	Description
Remove	Remove Member button – delete the selected zone from a zone set, or delete the selected port/device from a zone
Paste	Paste button – pastes clipboard items into selected zone set tree items.
Copy	Copy button – copies items selected in the zone set tree to the clipboard.
■	Switch port icon – not logged in
🟩	Switch port icon – logged in
▣	NL_Port (loop) device icon – logged in to fabric
□	NL_Port (loop) device icon – not logged in to fabric
▮	N_Port device icon – logged in to fabric
▯	N_Port device icon – not logged in to fabric

Resolving Zoning

The Resolving Zoning options enable you to manage the active, configured, and merged zone sets in the zoning database. To access the Resolving Zoning options, open the faceplate display, open the Zoning menu, and select Resolve Zoning

Capture Active Zoning

The Capture Active Zoning option copies the active zone set to the configured zone set.

Restore Configured Zoning

The Restore Configured Zoning option reverts back to the previously saved configured zone set.

Capture Merged Zoning

The Capture Merged Zoning option saves the merged zone set into the configured zone set.

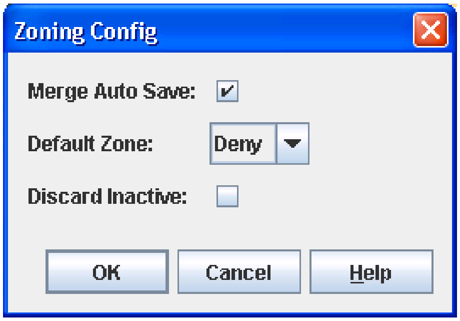
View Merged/Configured Differences

The View Merged/Configured Differences option opens a dialog to display the Merged and Configured zone sets in split panes. The items in the Merged but not the Configured are shown in red (*not persistent* after switch reset). The items in the Configured but not the Merged show up as green (*are persistent* after switch reset). The bottom pane is an English description of the differences in summary.

Configuring the Zoning Database

Use the Zoning Config dialog to change the Merge Auto Save, Default Zone, and Discard Inactive configuration parameters. In the faceplate display, open the Zoning menu and select Edit Zoning Config to open the Zoning Config dialog (FIGURE 3-4). After making changes, click the OK button to put the new values into effect.

FIGURE 3-4 Zoning Config Dialog



Merge Auto Save: ☑

Default Zone: Deny

Discard Inactive: □

Merge Auto Save

The Merge Auto Save parameter determines whether changes to the active zone set that a switch receives from other switches in the fabric will be saved to the zoning database on that switch. Changes are saved when an updated zone set is activated. Zoning changes are always saved to temporary memory. However, if Merge Auto Save is enabled, the switch firmware saves changes to the active zone set in temporary memory and to the zoning database. If Merge Auto Save is disabled, changes to the active zone set are stored only in temporary memory which is cleared when the switch is reset.

Note – Disabling the Merge Auto Save parameter can be useful to prevent the propagation of zoning information when experimenting with different zoning schemes. However, leaving the Merge Auto Save parameter disabled can disrupt device configurations should a switch have to be reset. For this reason, the Merge Auto Save parameter should be enabled in a production environment.

Default Zone

The Default Zone parameter enables (Allow) or disables (Deny) communication among ports/devices that are not defined in the active zone set or when there is no active zone set. This parameter must have the same value throughout the fabric. If interop mode is not Standard mode, the Default Zone parameter is automatically distributed throughout the fabric.

Discard Inactive

The Discard Inactive parameter automatically removes inactive zones and zone sets when a zone set is activated or deactivated from a remote switch.

Saving the Zoning Database to a File

You can save the zoning database to an XML file. You can later reload this zoning database on the same switch or another switch. To save a zoning database to a file, do the following:

1. In the faceplate display, open the Zoning menu, and select Edit Zoning.
2. In the Edit Zoning dialog, open the File menu and select Save As.
3. In the Save dialog, enter a file name for the XML file.
4. Click the Save button to save the zoning database.

Restoring the Zoning Database from a File

Caution – Restoring the zoning database from a file will replace the current zoning database on the switch.

Do the following to restore the zoning database from a file to a switch:

1. In the faceplate display, open the Zoning menu and select Edit Zoning to open the Edit Zoning window.
2. Open the File menu and select Open File. A popup window will prompt you to select an XML zoning database file.
3. Select a file and click Open.
4. Click the OK button to apply the changes.

Restoring the Default Zoning Database

Restoring the default zoning clears the switch of all zoning definitions.

Caution – This command will deactivate the active zone set.

To restore the default zoning for a switch, do the following:

1. In the faceplate display, open the Zoning menu and select Restore Default Zoning.
2. Click the OK button to confirm that you want to restore default zoning, deactivate any currently active zone set, and save changes to the zoning database.

Removing All Zoning Definitions

To clear all zone and zone set definitions from the zoning database, choose one of the following:

- Open the Edit menu and select Clear Zoning. In the Removes All dialog, click the Yes button to confirm that you want to delete all zones and zone sets.
- Right-click the Zone Sets heading at the top of the Zone Sets tree, and select Clear Zoning from the popup menu. Click the Yes button to confirm that you want to delete all zone sets and zones.

Managing Zone Sets

Zoning a fabric involves creating a zone set, creating zones as zone set members, then adding devices as zone members. The zoning database supports multiple zone sets to serve the different security and access needs of your storage area network, but only one zone set can be active at one time. Managing zone sets consists of the following tasks:

- Creating a Zone Set
- Activating and Deactivating a Zone Set
- Renaming a Zone Set
- Removing a Zone Set

Note – Changes that you make to the zoning database are limited to the managed switch and do not propagate to the rest of the fabric. To distribute changes to configured zone sets fabric wide, you must edit the zoning databases on the individual switches.

Creating a Zone Set

To create a zone set, do the following:

1. Open the Zoning menu, and select Edit Zoning to open the Edit Zoning dialog.

2. Open the Edit menu, and select Create Zone Set to open the Create Zone Set dialog.

3. Enter a name for the zone set, and click the OK button. The new zone set name is displayed in the Zone Sets tree. A zone set name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, -, ^, and $.

4. To create new zones in a zone set, do one of the following:
   - Right-click a zone set and select Create A Zone from the popup menu. In the Create a Zone tree, enter a name for the new zone, and click the OK button. The new zone name is displayed in the Zone Sets dialog.
   - Select a zone set in the zone sets tree, and click the Zone button in the Zoning toolbar. In the Create a Zone dialog, enter a name for the new zone, and click the OK button. The new zone name is displayed in the Zone Sets tree.
   - Copy an existing zone by dragging a zone into the new zone set. Refer to "Copying a Zone to a Zone Set" on page 72.

5. Click the Apply button to open the Save Zoning & Error Check dialog.

6. Click the Save Zoning button to save the changes, and open the Zone Set Activation dialog.

7. Click the Yes button to activate the zoneset after saving the changes, or click the No button to not activate the zoneset after saving the changes.

8. Click the Close button to close the Save Zoning & Error Check dialog.

9. Click the Close button.

Activating and Deactivating a Zone Set

You must activate a zone set to apply its zoning definitions to the fabric. Only one zone set can be active at one time. When you activate a zone set, the switch distributes that zone set to the temporary zoning database on every switch in the fabric.

The purpose of the deactivate function is to suspend all fabric zoning which results in free communication fabric wide or no communication. It is not necessary to deactivate the active zone set before activating a new one.

- To activate a zone set, open the Zoning menu and select Activate Zone Set to open the Activate Zone Set dialog. Select a zone set from the Select Zone Set drop-down list, and click the Activate button.
- To deactivate the active zone set, open the Zoning menu, select Deactivate Zone Set. Acknowledge the warning about traffic disruption, and click the Yes button to confirm that you want to deactivate the active zone set.

Renaming a Zone Set

To rename a zone set, do the following:

1. In the Zone Sets tree of the Edit Zoning dialog, click the zone set to be renamed.
2. Open the Edit menu and select Rename.
3. In the Rename Zone Set dialog, enter a new name for the zone set.
4. Click the OK button.

Removing a Zone Set

Removing a zone set from the database affects the member zones in the following ways.

- Member zones that are members of other zone sets are not affected.
- Zones that are currently not in a zone set are considered to be part of the "orphan zone set". The orphan zone set is not an actual zone set, but rather a way of displaying the zones that are not currently in a zone set.

To delete a zone set from the database, do the following:

1. In the faceplate display, open the Zoning menu and select Edit Zoning to open the Edit Zoning dialog.
2. In the Zone Sets tree, select the zone set to be removed.
3. Open the Edit menu, and select Remove.
4. Click the Yes button to open the Error Check dialog.
5. Click the Error Check button to open the Save Zoning & Error Check dialog.
6. Click the Save Zoning button to implement the changes.
7. Click the Close button to close the Save Zoning & Error Check dialog.

Managing Zones

Managing zones involves the following:

- Creating a Zone in a Zone Set
- Adding Zone Members
- Renaming a Zone
- Removing a Zone Member

- Removing a Zone from a Zone Set
- Removing a Zone from All Zone Sets

Note – Changes that you make to the zoning database are limited to the managed switch and do not propagate to the rest of the fabric. To distribute changes to configured zone sets fabric wide, you must edit the zoning databases on the individual switches.

Creating a Zone in a Zone Set

To create a zone in a zone set, do the following:

1. Open the Zoning menu, and select Edit Zoning to open the Edit Zoning dialog.
2. Select a zone set.
3. Open the Edit menu and select Create a Zone.
4. In the Create a Zone dialog, enter a name for the new zone, and click the OK button. The new zone name is displayed in the Zone Sets dialog. A zone name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, ^, $, and -.

Note – If you enter the name of a zone that already exists in the database, the Enterprise Fabric Suite 2007 application will ask if you would like to add that zone and its membership to the zone set.

---

5. To add switch ports or attached devices to the zone, choose one of the following:
   - In the zone set tree, select the zone set, then select the zone to which to add members. In the graphic window, select the port to add to the zone. Open the Edit menu and select Add Members.
   - Select a port by port number, Fibre Channel address, or world wide name in the Port/Device tree, and drag it into the zone.
   - Select a port by port number, Fibre Channel address, or world wide name in the Port/Device tree. Right-click the zone and select Add Zone Member(s) from the popup menu.
6. Click the Apply button to open the Save Zoning & Error Check dialog.

Copying a Zone to a Zone Set

To copy an existing zone and its membership from one zone set to another, do the following:

1. In the faceplate display, open the Zoning menu and select Edit Zoning to open the Edit Zoning dialog.
2. Choose one of the following:
   - In the zone set tree, select the zone to copy, and click the Copy button. Select the zone set destination and click the Paste button.
   - In the zone set tree, select the zone to copy, and drag it to the chosen zone set.
3. Click the Apply button to open the Save Zoning & Error Check dialog.
4. Click the Perform Error Check button to have the application check for zoning conflicts, such as empty zones, aliases, or zone sets.
5. Click the Save Zoning button to implement the changes.
6. Click the Close button to close the Error Check dialog.

Adding Zone Members

You can zone a port/device by switch domain ID and port number, device port Fibre Channel address, or the device port WWN. Adding a port/device to a zone affects every zone set in which that zone is a member. To add ports/devices to a zone, do the following:

1. Open the Zoning menu, and select Edit Zoning to open the Edit Zoning dialog.
2. Choose one of the following methods to add the port/device:
   - Select a port/device in the Port/Device tree, and drag it into the zone. To select multiple ports/devices, press the Control key while selecting.
   - Select a port/device in the Port/Device tree. To select multiple ports/devices, press the Control key while selecting. Select a zone set in the left pane. Open the Edit menu and select Add Members.
   - Select a port/device in the Port/Device tree. To select multiple ports/devices, press the Control key while selecting. Select a zone set in the left pane. Click the Insert button.

   If the port/device you want to add is not in the Port/Device tree, you can add it by doing the following:

   a. Right-click the selected zone.

   b. Open the Edit menu and select Create Members.

c. Select the WWN, Domain/Port, or FC Address option.

d. Enter the hexadecimal value for the port/device according to the option selected: 16 digits for a WWN member, 4 digits for a Domain/ Port member (DDPP), or a 6-digit Fibre Channel Address for a First Port Address member (DDPPAA) where D=domain ID, P=port number, and A=ALPA.

3. Click the OK button on the Create Zone Member dialog.
4. Click the Apply button to open the Save Zoning & Error Check dialog.
5. Click the Save Zoning button to implement the changes.
6. Click the Close button to close the Error Check dialog.
7. On the Edit Zoning dialog, click the Close button to close the Edit Zoning dialog.

Note – Domain ID conflicts can result in automatic reassignment of switch domain IDs. These reassignments are not reflected in zones that use domain ID/port number pair to define their membership. Be sure to reconfigure zones that are affected by a domain ID change.

Renaming a Zone

To rename a zone, do the following:

1. In the Zone Sets tree of the Edit Zoning dialog, click the zone to be renamed.
2. Open the Edit menu and select Rename.
3. In the Rename Zone dialog, enter a new name for the zone.
4. Click the OK button.

Removing a Zone Member

Removing a zone member will affect every zone and zone set in which that zone is a member. To remove a member from a zone:

1. In the Edit Zoning dialog, select the zone member to be removed.
2. Open the Edit menu and select Remove.
3. Click the Yes button in the Remove dialog.
4. Click the Apply button to save the changes and open the Save Zoning & Error Check dialog.

5. Click the Save Zoning button to implement the changes.

Removing a Zone from a Zone Set

To remove a zone from a zone set, do the following:

1. In the Edit Zoning dialog, select the zone to be removed. The selected zone will be removed from that zone set only.
2. Open the Edit menu and select Remove.
3. Click the Yes button in the Remove dialog.
4. Click the Apply button to save the changes and open the Save Zoning & Error Check dialog.
5. Click the Save Zoning button to implement the changes.

Removing a Zone from All Zone Sets

To remove a zone from all zone sets, do the following:

Note – Zones that are currently not in a zone set are considered to be part of the "orphan zone set". The orphan zone set is not an actual zone set, but rather a way of displaying the zones that are not currently in a zone set.

---

1. In the Edit Zoning dialog, select the zone to be removed.
2. Open the Edit menu and select Delete Zone.
3. Click the Yes button in the Remove dialog.
4. Click the Apply button in the Edit Zoning dialog to open the Save Zoning & Error Check dialog.
5. Click the Save Zoning button to implement the changes.

Managing Aliases

An alias is a collection of objects that can be zoned together. An alias is not a zone, and can not have a zone or another alias as a member.

Note – Changes that you make to the zoning database are limited to the managed switch and do not propagate to the rest of the fabric. To distribute changes to configured zone sets fabric wide, you must edit the zoning databases on the individual switches. You will not see aliases in the active zone set.

Creating an Alias

To create an alias, do the following:

1. Open the Zoning menu, and select Edit Zoning to open the Edit Zoning dialog.
2. Open the Edit menu, and select Create Alias to open the Create Alias dialog.
3. Enter a name for the alias, and click the OK button. The alias name is displayed in the Zone Sets dialog. An alias name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -.
4. Click the Apply button to open the Save Zoning & Error Check dialog.

Adding a Member to an Alias

You can add a port/device to an alias by domain ID and port number, device port Fibre Channel address, or the device port WWN. To add ports/devices to an alias, do the following:

1. Open the Zoning menu, and select Edit Zoning to open the Edit Zoning dialog.
2. Choose one of the following methods to add the port/device:
   - Select a port/device in the Port/Device tree, and drag it into the alias.
   - Select a port/device in the Port/Device tree. Click an alias to select multiple ports/devices, press the Control key while selecting. Select an alias. Open the Edit menu and select Add Members.
   - Select a port/device in the Port/Device tree. To select multiple ports/devices, press the Control key while selecting. Select an alias. Click the Insert button.

   If the port/device you want to add is not in the Port/Device tree, you can add it by doing the following:

   a. Right-click the selected alias.

   b. Open the Edit menu and select Create Members.

   c. Select the WWN, Domain/Port, or FC Address option.

d. Enter the hexadecimal value for the port/device according to the option selected: 16 digits for a WWN member, 4 digits for a Domain/ Port member (DDPP), or a 6-digit Fibre Channel Address for a First Port Address member (DDPPAA) where D=domain ID, P=port number, and A=ALPA.

3. Click the OK button to add the member to the alias.

Removing an Alias from All Zones

To remove an alias from all zones, do the following:

1. In the Zone Sets tree in the Edit Zoning dialog, select the alias to be removed.
2. Open the Edit menu, and select Delete Alias.
3. Click the Yes button in the Remove dialog.
4. Click the Apply button to open the Save Zoning & Error Check dialog.
5. Click the Save Zoning button to implement the changes.

Merging Fabrics and Zoning

If you join two fabrics with an inter-switch link, the active zone sets from the two fabrics attempt to merge automatically. The fabrics may consist of a single switch or many switches already connected together. The switches in the two fabrics attempt to create a new active zone set containing the union of each fabric's active zone set. The propagation of zoning information only affects the active zone set, not the configured zone sets, unless Merge Auto Save is turned on.

Zone Merge Failure

If a zone merge is unsuccessful, the inter-switch links (ports) between the fabrics will isolate due to a zone merge failure, which will generate an alarm. The reason for the E_Port isolation can also be determined by viewing the port information. Refer to "Port Information Data Window" on page 173.

A zone merge will fail if the two active zone sets have member zones with identical names that differ in membership or type. For example, consider Fabric A and Fabric B each with a zone named "ZN1" in its active zone set. Fabric A "ZN1" contains a member specified by Domain ID 1 and Port 1; Fabric B "ZN1" contains a member specified by Domain ID 1 and Port 2. In this case, the merge will fail because the two zones have the same name, but different membership.

A zone merge may also fail if the merged zones/members exceeds the max zoning limits. Refer to "Viewing Zoning Limits and Properties" on page 57 for more information on zoning limits.

Zone Merge Failure Recovery

When a zone merge failure occurs, the conflict that caused the failure must be resolved. You can correct a failure due to a zone conflict by deactivating one of the active zone sets or by editing the conflicting zones so that their membership is the same. You can deactivate the active zone set on one fabric if the active zone set on the other fabric accurately defines your zoning needs. If not, you must edit the zone memberships, and reactivate the zone sets. After correcting the zone membership, reset the isolated ports to allow the fabrics to join.

Note – If you deactivate the active zone set in one fabric and the Merge Auto Save parameter is enabled, the active zone set from the second fabric will propagate to the first fabric and replace all zones with matching names in the configured zone sets.

Refer to "Managing Zones" on page 70 for information about adding and removing zone members. Refer to "Resetting a Port" on page 188 for information about resetting a port.

CHAPTER 4

Managing Fabric Security

The following fabric security concepts provide context for fabric security management tasks.

- Security Consistency Checklist
- Connection Security
- User Account Security
- Port Security
- Configured Security Data Window
- Active Security Data Window
- Fabric Binding
- Device Security

Security Consistency Checklist

The Security Consistency Checklist dialog allows you to view current security-related settings, firmware versions, embedded gui, in-band management, date/time on switches. Any changes must be made through the appropriate dialog, such as Network Properties dialog, Switch Properties dialog, or SNMP Properties dialog. To open the Security Consistency Checklist dialog, open the Switch menu and select Security Consistency Checklist.

Connection Security

Connection security provides an encrypted data path for switch management methods. The switch supports the Secure Shell (SSH) protocol for the command line interface and the Secure Socket Layer (SSL) protocol for management applications such as Enterprise Fabric Suite 2007 and Common Information Module (CIM).

The SSL handshake process between the workstation and the switch involves the exchanging of certificates. These certificates contain the public and private keys that define the encryption. The switch certificate is valid for one year beginning with its creation date and time. The workstation validates the switch certificate by comparing the workstation date and time to the switch certificate creation date and time. For this reason, it is important to synchronize the workstation and switch with the same date, time, and time zone. If a certificate has not been created by the user, the switch will automatically create one.

Consider your requirements for connection security: for the command line interface (SSH), management applications such as Enterprise Fabric Suite 2007 (SSL), or both. If SSL connection security is required, also consider using the Network Time Protocol (NTP) to synchronize workstations and switches.

User Account Security

User account security is the process by which your user account and password are authenticated with the list of valid user accounts and passwords. The switch validates your account and password when you attempt to add a fabric using Enterprise Fabric Suite 2007 or log in to a switch through Telnet. Your system administrator defines accounts, passwords, and authority levels that are stored on the switch. Refer to “Managing User Accounts” on page 104 for more information.

The Admin account possesses Admin authority which grants full access to all tasks of the Enterprise Fabric Suite 2007 menu system. The switch validates your user account and Enterprise Fabric Suite 2007 grants access to its menus according to your authority level. If you do not have Admin authority, you are limited to monitoring tasks.

Note – If a user is logged into a switch using Enterprise Fabric Suite 2007 or CLI, and an administrator changes user access rights and passwords, existing logins will not be affected by the new settings. Login access and privileges are only checked for a new login request.

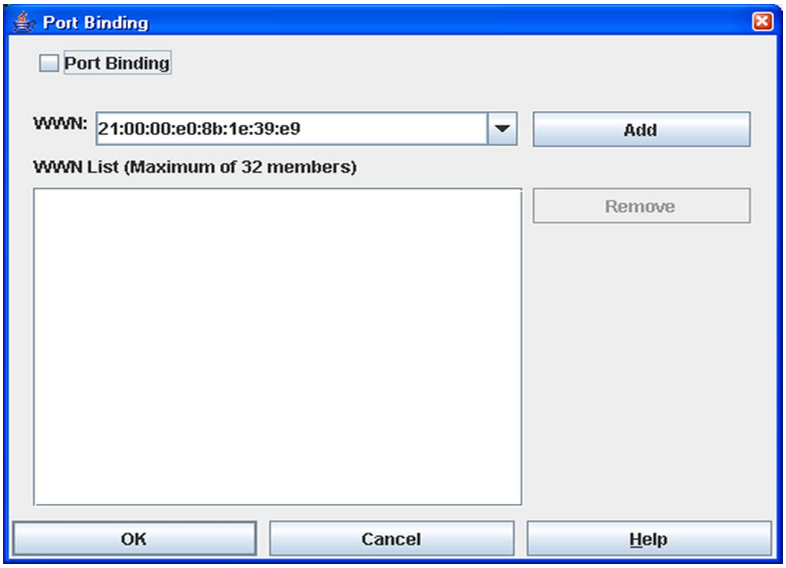
Port Security

Port binding ties a specific device WWN to a physical port number. The Port Binding dialog allows you to enable/disable port binding for the port, and will allow the user to add WWNs to the list of WWNs bound to the port. The dialog will display the values that are read from the port binding data received from the switch for the selected port.

To open the Port Binding dialog (FIGURE 4-1) select a single port on the faceplate display, open the Port menu, and select Port Binding to bind up to 32 WWNs to a port. The WWN drop-down field drop-down is pre-populated with WWNs currently attached to the port. Click the Add button to add the WWN listed in the field to the WWN list pane. The WWN List pane displays the WWNs that are currently bound or will be bound to the port with the selection of the OK button. To remove WNNs currently bound to a port, select the WWNs in the WWN List pane, click the Remove button, and click the OK button to apply the changes to the switch.

Note – If you enable the Port Binding option with no WWN entries in the list, the port becomes isolated.

FIGURE 4-1 Port Binding Dialog



□ Port Binding

WWN: 21:00:00:e0:8b:1e:39:e9

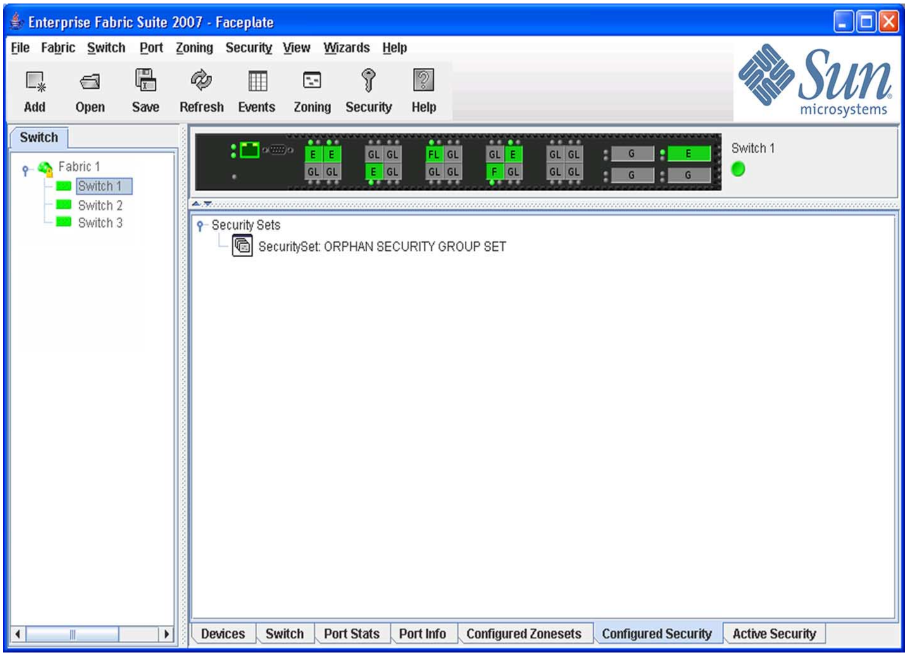
WWN List (Maximum of 32 members)

Configured Security Data Window

The Configured Security data window (FIGURE 4-2) displays a graphical representation of all security sets, groups, and members in the database. To open the Configured Security data window, click the Configured Security tab below the data window in the faceplate display.

Note – The Security data windows are available only on a secure (SSL) fabric and on the entry switch (out of band switch). Open the Switch menu and select **Services** to enable the SSL option for that switch. You must then close the fabric and re-establish a connection to secure the fabric using SSL.

FIGURE 4-2 Configured Security Data Window

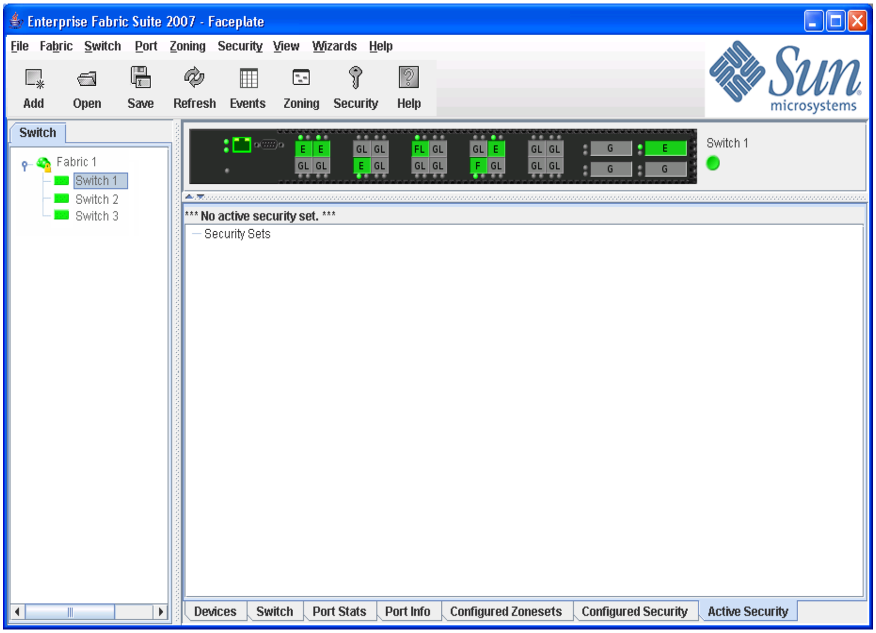


Active Security Data Window

The Active Security data window (FIGURE 4-3) displays a graphical representation of the active security set, its groups, and members in the database. To open the Active Security data window, click the Active Security tab below the data window in the faceplate display.

Note – The Security data windows are available only on a secure (SSL) fabric and on the entry switch (out of band switch). Open the Switch menu and select **Services** to enable the SSL option for that switch. You must then close the fabric and re-establish a connection to secure the fabric using SSL.

FIGURE 4-3 Active Security Data Window



*** No active security set. ***

Fabric Binding

Each switch maintains its own fabric security configuration consisting of the active security set (if one has been activated), any inactive security sets, domain IDs, world wide names, authentication type (Chap or None), Chap hash protocol (MD5 or SHA-1) and a hashing protocol secret. A switch may have more than one configured security set, but only one security set may be active on a switch.

Fabric binding requires that both the WWN and domain ID of a ISL security group member be verified to permit communication with other members in a security set. Fabric Binding is specific to the ISL security group type and provides an additional level of fabric security. Essentially, this "fabric binding security" limits the fabric to known domain IDs and switch WWNs. Fabric binding is associated with only the ISL security group type, and not with the Port and MS security group types. Security information configured for Port and MS security group types remains on the originating switch, and are not propagated fabric-wide.

If the Fabric Binding Enabled option is enabled in the Security Config dialog and the Domain ID Binding field is set (1—239), then the security sets that have ISL security group types will propagate/share the switch WWNs and the domain IDs associated with those switch WWNs with all switches in the fabric. However, authentication and secrets for each switch are not shared fabric-wide.

The following two conditions must be met to enforce fabric binding for ISL security groups:

- The Fabric Binding Enabled setting on the Security Config dialog must be selected.
- The Binding field then becomes active on the Create Security Group Member dialog, and must contain the domain ID associated with the Switch WWN for the ISL group member.

The Fabric Binding Enabled setting on the Security Config dialog has two functions:

- If selected, it enables the Binding field on the Create Security Group Member dialog.
- When selected, it permits the appropriate ISL-related security information in the activated security set and security configuration to be propagated fabric-wide. Note that the security information for Port and MS security group types does not get propagated.

When you activate a security set that does not contain a configured ISL security group, the security information remains local (pertains only to that switch). That is, no security information is propagated fabric-wide. When you activate a security set that does contain a configured ISL security group, the ISL-related security information is propagated fabric-wide.

The propagated ISL-related security information is then combined with the active security set on each switch and is automatically renamed the "Learned" security set. The Learned security set now consists of the most current active security set on that switch with new propagated domain ID and WWN information. The active security set is not renamed on the originating switch.

To activate a security set on a switch, open the Security menu, select Activate Security Set to open the Activate Security Set dialog. In the Activate Security Set dialog, select a security set from the drop-down list. Click the Activate button to activate that security set and turn on fabric binding on all switches in the fabric. When a security set is de-activated on a switch with the fabric binding enabled, the active security set on a switch is de-activated and the Fabric Binding Enabled setting is disabled on all switches in the fabric, except on the originating switch.

Before joining a switch to a fabric in which all switches have the Fabric Binding Enabled setting enabled, the Fabric Binding Enabled setting must be enabled on that switch. If not, an error will result and the switch will isolate.

Device Security

Device security provides for the authorization and authentication of devices that you attach to a switch. You can configure a switch with a group of devices against which the switch authorizes new attachments by devices, other switches, or devices issuing management server commands. Device security is configured through the use of security sets and groups. A group is a list of device world wide names that are authorized to attach to a switch. There are three types of groups: one for other switches (ISL), another for devices (port), and a third for devices issuing management server commands (MS). A security set is a set of up to three groups with no more than one of each group type. Each switch maintains its own security configuration consisting of the active security set (if one has been activated), inactive security sets, domain IDs, world wide names, authentication type (Chap or None), Chap hash protocol (MD5 or SHA-1) and a hashing protocol secret.

Note – The Security dialogs are available only on a secure (SSL) fabric and on the entry switch (out of band switch). Open the Switch menu and select **Services** to enable the SSL option for that switch. You must then close the fabric and re-establish a connection to secure the fabric using SSL.

In addition to authorization, the switch can be configured to require authentication to validate the identity of the connecting switch, device, or host. Authentication can be performed locally using the switch security database, or remotely using a Remote Authentication Dial-In User Service (RADIUS) server. With a RADIUS server, the security database for the entire fabric resides on the server. In this way, the security database can be managed centrally, rather than on each switch. You can configure up to five RADIUS servers to provide failover.

You can configure the RADIUS server to authenticate just the switch or both the switch and the initiator device if the device supports authentication. When using a RADIUS server, every switch in the fabric must have a network connection. A RADIUS server can also be configured to authenticate user accounts.

Consider the devices, switches, and management agents and evaluate the need for authorization and authentication. Also consider whether the security database is to distributed on the switches or centralized on a RADIUS server and how many servers to configure.

Managing device security involves the following tasks:

- Creating security sets, groups, and members
- Editing a security configuration on a switch
- Viewing properties of a security set, group, or member
- Archiving a security configuration on a switch to a file
- Activating and deactivating a security set

The security database is made up of all security sets on the switch. The security database has the following limits:

- Maximum number of security sets is 4.
- Maximum number of security groups is 16.
- Maximum number of members in a group is 1000.
- Maximum total number of group members is 1000.

Managing Device Security

Device security consists of the following tasks:

- Using the Edit Security Dialog
- Using the Security Config Dialog
- Using RADIUS Servers

Using the Edit Security Dialog

The Edit Security dialog (FIGURE 4-4) opens after clicking the Security button on the toolbar or selecting Edit Security from the Security menu. The primary use of the Edit Security dialog is to edit the security configuration on the switch. You can also open and edit a security configuration saved to a file. Editing security files consists of renaming and removing security sets, groups, and members.

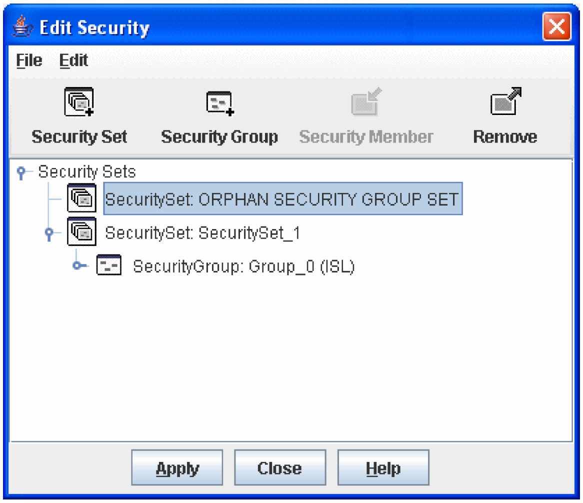
Note – The Security dialogs are available only on a secure (SSL) fabric and on the entry switch (out of band switch). Open the Switch menu and select Services to enable the SSL option for that switch. You must then close the fabric and re-establish a connection to secure the fabric using SSL.

Use the Edit menu options or popup menu options to access Edit Security dialog options. Select a security item in the graphic window and select an option in the Edit menu, or right-click on a security item in the graphic window, and select an option from the popup menus.

The orphan security set contains the security groups and members that don't belong to a user-defined security set. Excluding the orphan security set, you can only have 1 group type in a security set. The three types of security groups are:

- ISL — default (E_Port authentication)
- MS (Management Server CT authentication)
- Port (F_Port authentication)

FIGURE 4-4 Edit Security Dialog



Security Sets
SecuritySet: ORPHAN SECURITY GROUP SET
SecuritySet: SecuritySet_1
SecurityGroup: Group_0 (ISL)

Use the File menu to:

- Open or edit security files.
- Save or rename security files

Use the Edit menu to:

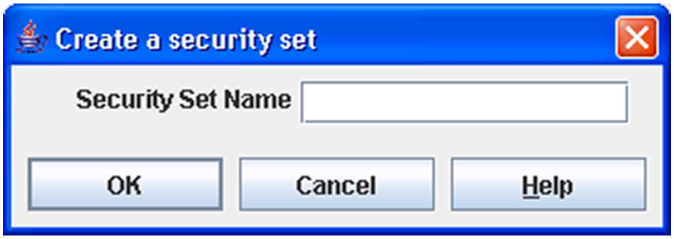
- Create security sets, security groups, and security group members
- Edit security group members
- Rename or remove a security group from a security set or a member from a security group
- Remove a group from all security sets
- Remove all security sets, groups, or members
- View properties for the selected security set, group, or group member

Creating a Security Set

There is a maximum of 4 security sets. To add a security set, do the following:

1. On the faceplate display, click the Security button on the toolbar, or open the Security menu and select Edit Security to open the Edit Security dialog.
2. Choose one of the following methods to open the Create a Security Set dialog:
    - Click the Security Set button in the toolbar.
    - Right-click in the graphic window, and select New Security Set from the popup menu.
    - Open the Edit menu and select Create Security Set.

FIGURE 4-5 Create Security Set Dialog



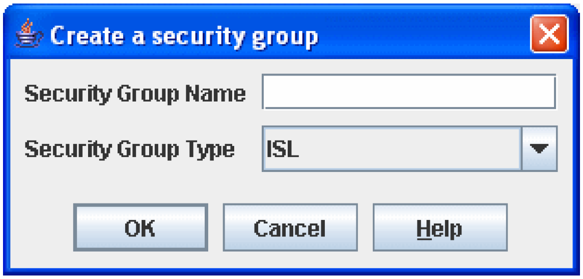
3. Enter a name for the security set . The naming conventions for security sets are:
    - Must start with a letter
    - All alphanumeric chars [aA- zZ] [0-9]
    - The symbols $ _ - and ^ are the only symbols allowed

4. Click the OK button to close the Create a Security Set dialog.

Create a Security Group Dialog

Use the Create a Security Group dialog (FIGURE 4-6) to add a security group to a security set. The Create a Security Group dialog is displayed after clicking the Security Group button on the toolbar, or after you right-click on a security set in the graphic window and select Create a Security Group from the popup menu.

FIGURE 4-6 Create Security Group Dialog



Security Group Name

Security Group Type: ISL

The naming conventions for all security groups are listed below.

- Must start with a letter
- All alphanumeric chars [aA- zZ] [0-9]
- The symbols $ _ - and ^ are the only symbols allowed

Creating a Security Group

An empty (no members) security group in the active security set will prevent all connections for that security group type. For example, an empty ISL security group will cause the switch to refuse all logins from other switches. To add a security group to a security set, do the following:

1. On the faceplate display, click the Security button on the toolbar, or open the Security menu and select Edit Security to open the Edit Security dialog.

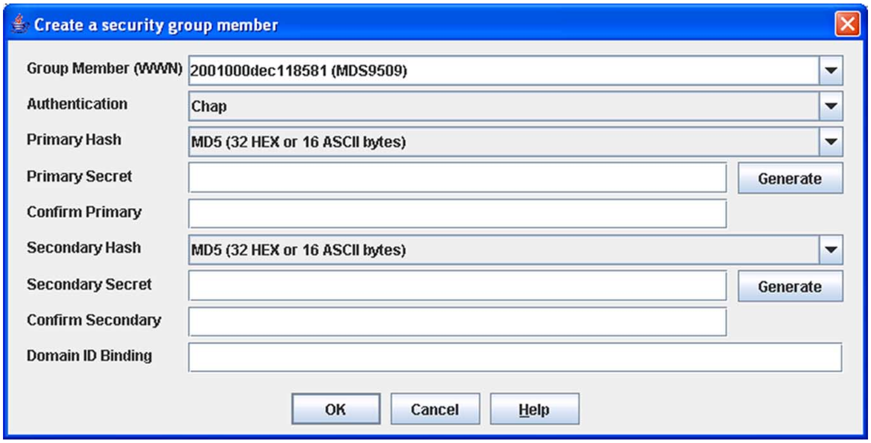
2. Choose one of the following methods to open the Create a Security Group dialog:
   - In the graphic window, click a security set and click the Security Group button in the toolbar.
   - Right-click on a security set and select Create a Security Group from the popup menu.

3. Enter a security group name and select a security group type (ISL, Port, or MS). Remember, only one security group type (1 ISL, 1 Port, 1 MS) in each security set is allowed. The naming conventions for security groups are:
   - Must start with a letter
   - All alphanumeric chars [aA- zZ] [0-9]
   - The symbols $ _ - and ^ are the only symbols allowed
4. Click the OK button to save the change.

Create a Security Group Member Dialog

Use the Create a Security Group Member dialog (FIGURE 4-7) to add a member to a security group. Choose options in the Group Member (or manually type in a hex value) and Authentication drop-down lists. The Group Member WWN drop-down list identifies the currently attached WWNs. Enter values in the Primary/Secondary Secret, Confirm Primary/Secondary, and Domain ID Binding (ISL groups only) fields.

FIGURE 4-7 Create a Security Group Member Dialog



Create a security group member

Group Member (WWN)	2001000dec118581 (MDS9509)
Authentication	Chap
Primary Hash	MD5 (32 HEX or 16 ASCII bytes)
Primary Secret	
Confirm Primary	
Secondary Hash	MD5 (32 HEX or 16 ASCII bytes)
Secondary Secret	
Confirm Secondary	
Domain ID Binding	

The conventions for ISL security group members are listed below:

- You can enter member world wide name (WWN), which must be 16 hex characters, or 23 characters with valid WWN format xx:xx:xx:xx:xx:xx:xx:xx.
- The authentication choices are None and Chap.
- Primary and Secondary Hash fields:

  - **Primary Hash** — the primary algorithm used first to authenticate the communication link. If the primary algorithm is not supported on the authentication initiator end of the link, the secondary algorithm is used. If there is no common algorithm (either primary or secondary) configured between the two ends of the link, the link will isolate.
  - **Secondary Hash** — the secondary algorithm used to authenticate the communication link. If there is no common algorithm (either primary or secondary) configured between the two ends of the link, the link will isolate.
- The (two) Secret fields are disabled if authentication is None. If authentication is Chap, the Secret fields are enabled.
- The Generate button is only enabled when authentication is Chap.
- The domain ID of the Group Member world wide name. Valid range is 1–239. Entering 0 (zero) is considered a null character, resulting in no domain ID binding.

The conventions for Port security group members are listed below:

- You can enter member world wide name (WWN), which must be 16 hex characters, or 23 characters with valid WWN format xx:xx:xx:xx:xx:xx:xx:xx.
- The authentication choices are None and Chap.
- Primary Hash and Secondary Hash fields:
  - **Primary Hash** — the primary algorithm used first to authenticate the communication link. If the primary algorithm is not supported on the authentication initiator end of the link, the secondary algorithm is used. If there is no common algorithm (either primary or secondary) configured between the two ends of the link, the link will isolate.
  - **Secondary Hash** — the secondary algorithm used to authenticate the communication link. If there is no common algorithm (either primary or secondary) configured between the two ends of the link, the link will isolate.
- Primary Secret and Secondary Secret fields:
  - Enter an authentication "password" to be assigned to that member. Or, you can click the Generate buttons to randomly generate secrets.
  - Both Secret fields are disabled if authentication is None. If authentication is Chap, the Secret fields are enabled.
- The Generate button is only enabled when authentication is Chap.
- Confirm Primary and Confirm Secondary fields:
  - **Confirm Primary** — re-enter the primary hash key to validate the primary secret.
  - **Confirm Secondary** — re-enter the secondary hash key to validate the secondary secret.

The conventions for MS security group members are listed below:

- You can enter member world wide name (WWN), which must be 16 hex characters, or 23 characters with valid WWN format xx:xx:xx:xx:xx:xx:xx:xx.
- The authentication choices are None and Chap.
- The (one) Secret field is disabled if authentication is None. If authentication is Chap, the Secret field is enabled.
- Enter the Confirm Primary field re-enter the primary hash key to validate the primary secret.
- The Generate button is only enabled when authentication is Chap.

Creating a Security Group Member

To add a member to a security group, do the following:

1. On the faceplate display, click the Security button on the toolbar, or open the Security menu and select Edit Security to open the Edit Security dialog.
2. Choose one of the following methods to open the Create a Security Group Member dialog:
   - In the graphic window, click a security group and click the Security Member button in the toolbar.
   - Right-click on a security group and select Create Members from the popup menu.
   - Open the Edit menu and select Create Members.
3. Open the Group Member drop-down list and select a Node world wide name. The switch must be a member of any group in which authentication is used. You can also type in a hex value.
4. Open the Authentication drop-down list, and select a type of protocol to be used for the authentication process for that member: None (0 bytes) or Chap (16 bytes)
5. In the Secret area, enter an authentication "password" to be assigned to that member. Or, you can click the Generate button to randomly generate a secret.
6. If using fabric binding, in the Domain ID Binding field (ISL groups only), enter the domain ID (1-239) for the switch for the ISL group member. The WWN of the switch must be at the specified domain ID when attempting to enter the fabric, otherwise it will become isolated.
7. Click the OK button to close the Create a Security Group Member dialog.

Editing the Security Configuration on a Switch

To edit a security configuration on the switch, do the following:

1. On the faceplate display, click the Security button on the toolbar, or open the Security menu and select Edit Security to open the Edit Security dialog. By default, the current security configuration on the switch is displayed in the Edit Security dialog. To edit a security configuration previously saved to a file, open the File menu and select Open File, or press Ctrl+o (letter o) to open the Open dialog. Browse for and select the security file, and click the Open button to display the security file in the Edit Security dialog.

2. Select the security item to edit in the graphic window, and choose one of the following:

   - **Rename a Security Set**, **or Group**. Open the Edit menu and select a Rename option. In the Rename dialog, enter a new name and click the OK button.
   - **Edit Security Group Member**. Open the Edit menu and select an Edit Security Group Member option. In the Edit Security Group Member dialog, enter a new Group Member (WWN), choose an option in the Authentication drop-down list, and click the OK button.
   - **Remove a Security Set**, **Group**, **or Member**. Select the item to remove, open the Edit menu and select a Remove option. In the Remove dialog, click the Yes button to remove that item.
   - **Clear Security.** Select the Security Sets directory name, open the Edit menu and select Clear Security. In the Remove dialog, click the Yes button to remove all security sets and save the changes. You can also right-click on the Security Sets (top level) directory name, and select Clear Security from the popup menu, and click the Yes button to remove all security sets.

3. Click the Apply button to display the Save Security dialog.

4. Click the Save Security button to apply changes to switch.

5. Click the Close button to close the Save Security dialog.

Viewing Properties of a Security Set or Security Group

To view the properties of a security set or security group, do the following:

1. On the faceplate display and click the Security button on the toolbar, or open the Security menu and select Edit Security to open the Edit Security dialog.

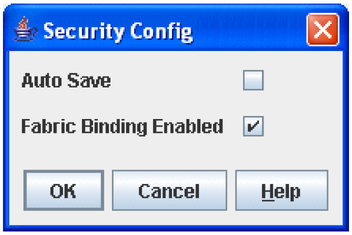
   - Choose one of the following:
   - Select a security set or security group, open the Edit menu and select Properties.
   - In the graphic window, right-click on the security set or security group, and select Properties from the popup menu.

2. View the security information for the selected item in the Properties dialog.

Using the Security Config Dialog

Use the Security Config dialog (FIGURE 4-8) to save the active security configuration on the switch to non-volatile memory or to temporary memory, or to require the domain ID of a switch be validated before attaching to the fabric.

FIGURE 4-8 Security Config Dialog



Auto Save □

Fabric Binding Enabled ☑

To configure security on the switch, do the following:

1. On the faceplate display, open the Security menu and select Edit Security Config to open the Security Config dialog.

2. Select the Auto Save option to enable (default) or disable Auto Save mode. If enabled, the security configuration is saved to non-volatile memory on the switch. If disabled, the security file is saved only to temporary memory. The Auto Save feature is used when Fabric Binding is enabled. When Auto Save is disabled, any updates from remote switches will not be saved locally. If the local switch is reset, it may isolate.

3. Select the Fabric Binding Enabled option to require that the expected domain ID of a switch be verified before being allowed to attach to the fabric.

4. Click the OK button to save the settings and close the Security Config dialog.

Archiving a Security Configuration to a File

To archive (save) a security configuration to a file, do the following:

1. On the faceplate display, click the Security button on the toolbar, or open the Security menu and select Edit Security to open the Edit Security dialog.

2. Configure the security settings as desired.

3. Open the File menu and select Save As.

4. In the Save dialog, enter a name and location for the security file (.xml extension).

5. Click the Save button to save the security configuration to a file.

6. In the File Password dialog, enter a password and click the Yes button to save the file with a password and close the File Password dialog. Or, click the No button to save the file without a password and close the File Password dialog.

Activating a Security Set

Only one security set can be active at one time. To activate a security set, do the following:

1. On the faceplate display, open the Security menu and select Activate Security Set to open the Activate Security Set dialog.

2. In the Activate Security Set dialog, select a security set from the drop-down list.

3. Click the Activate button to activate the security set.

Deactivating a Security Set

Only one security set can be active at one time. To deactivate an active security set, do the following:

1. In the faceplate display, open the Security menu and select Deactivate Security Set.

2. In the Deactivate dialog, click the Yes button to confirm that you want to deactivate the active security set.

Using RADIUS Servers

Remote Authentication Dial In User Service (RADIUS) provides a method to centralize the management of authentication passwords in larger networks. It has a client/server model, where the server is the password repository and third party authentication point and the clients are all of the managed devices. RADIUS can be configured for devices and/or user accounts. The RADIUS server dialogs are available only on a secure fabric connection (SSL) and on the entry switch (out of band switch). Refer to "Connection Security" on page 80 and "Managing System Services" on page 128 for more information.

RADIUS is designed to authenticate users and devices using a challenge/response protocol. Basic implementations consist of a central RADIUS server containing a database of authorized users as well as authentication information. A RADIUS client wishing to verify the authenticity of a user issues a challenge to the user and collects the response to the challenge. This information is forwarded to the RADIUS server for authentication and the server responds with the results, either an accept or reject. The RADIUS client does not need to be configured with any user authentication information, this all resides on the RADIUS server and can be managed centrally and separately from the clients. In addition, no passwords are exchanged between the RADIUS server and its clients. Authentication of requests from a RADIUS client to the server and responses from the server to a client can also be authenticated. This requires sharing a secret between the server and client. The accounting RADIUS supports the auditing of the users and switch services such as Telnet, FTP, and switch management applications.

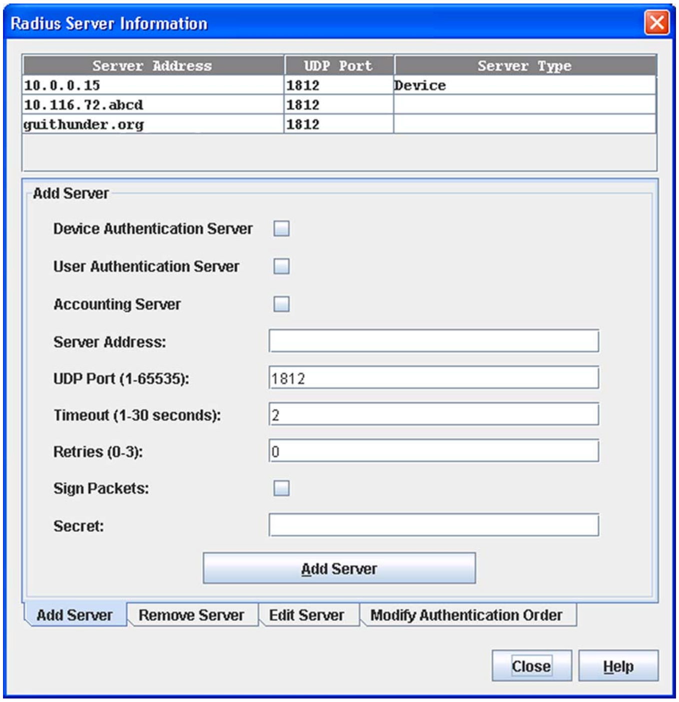
Note – The RADIUS server and Security dialogs are available only on a secure (SSL) fabric and on the entry switch (out of band switch). To enable the SSL option for a switch, open the Switch menu and select **Services**. In the Services dialog, select the **SSL** option. You must then close the fabric and re-establish a connection to secure the fabric using SSL.

Note – You may need to configure a security set for RADIUS device security that will be used in authenticating ISLs. Refer to "Creating a Security Set" on page 88 for more information.

Adding a RADIUS Server

When you add a RADIUS server, you provide a method to centralize the management of authentication passwords over a network.

FIGURE 4-9 Add Server



Server Address	UDP Port	Server Type
10.0.0.15	1812	Device
10.116.72.abcd	1812	
guithunder.org	1812	

Add Server

Device Authentication Server □

User Authentication Server □

Accounting Server □

Server Address:

UDP Port (1-65535): 1812

Timeout (1-30 seconds): 2

Retries (0-3): 0

Sign Packets: □

Secret:

To add a RADIUS server, do the following:

1. Open the faceplate display, open the Switch menu, and select Radius Servers.

2. In the Radius Server Information dialog (FIGURE 4-9), click the Add Server tab.

3. Select the server type (Device, User, Account).

4. In the IP Address field, enter the remote IP address of the server.

5. In the UDP Port field, enter the remote UDP port number of the Authentication Radius Server. The Radius Accounting Server UDP port will always be the value of Device/User Authentication Server UDP Port + 1.

6. In the Timeout field, enter the timeout value in seconds (minimum of 1 second, maximum of 30 seconds). This is the number of seconds the RADIUS client will wait for a response from the RADIUS server before retrying, or giving up on a request.

7. In the Retries field, enter the number of retries. This is the maximum number of times the RADIUS client will retry a request sent to the primary RADIUS server.

8. Select the Sign Packets option to enable the switch to include a digital signature (Message-Authenticator) in all RADIUS access request packets sent to the RADIUS server. A valid Message-Authenticator attribute will be required in all RADIUS server responses.

9. In the Secret field, enter the server secret. A secret is required for all RADIUS servers. The secret is used when generating and checking the Message-Authenticator attribute.

10. Click the Add Server button to add the server.

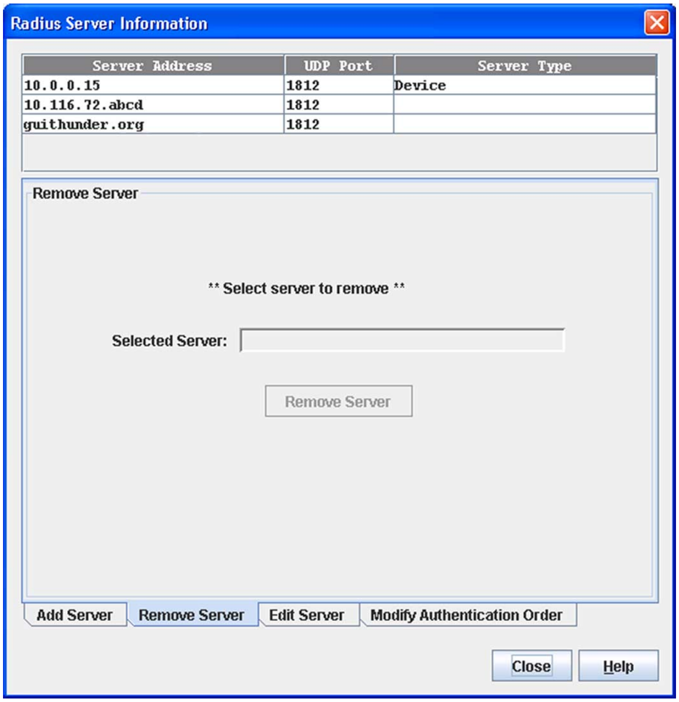
11. Click the Modify Authentication Order tab, and verify that Device Authentication Order and User Authentication Order options are set to either Radius or Radius Local for Radius Authentication to be implemented.
    - **Local** — only attempts to authenticate using local switch password database.
    - **RADIUS** — only attempts to authenticate using the RADIUS server (another computer that provides authentication).
    - **RADIUS Local** — attempts to authenticate using the RADIUS server. If the switch can not contact the RADIUS server due to a network or some other problem, the switch will authenticate using the local password database (active security set).

12. Click the Modify Order button to set the authentication order.

Removing a RADIUS Server

When you remove a RADIUS server, you disable the management of authentication usernames and passwords over the network for that server.

FIGURE 4-10 Remove Server



Radius Server Information

Server Address	UDP Port	Server Type
10.0.0.15	1812	Device
10.116.72.abcd	1812	
guithunder.org	1812	

Remove Server

** Select server to remove **

Selected Server:

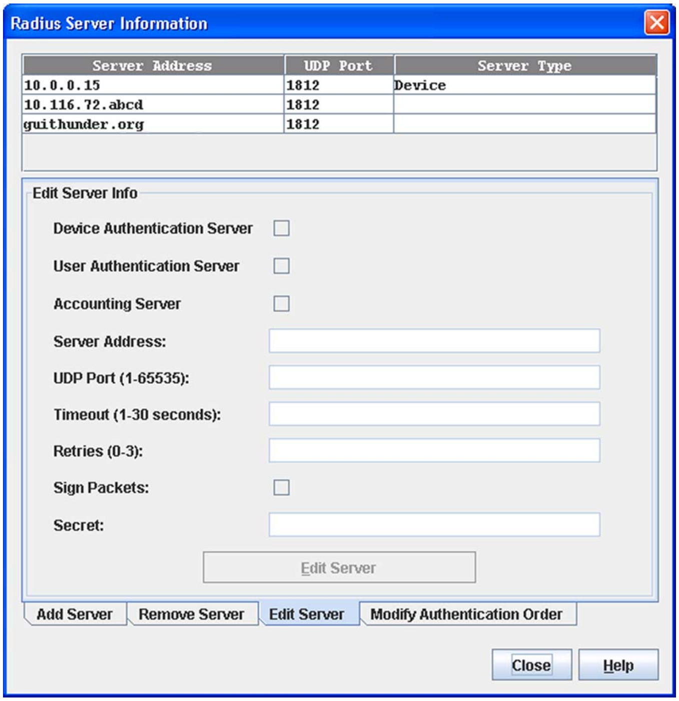
To remove a RADIUS server, do the following:

1. Open the faceplate display, open the Switch menu, and select Radius Servers.
2. In the Radius Server Information dialog (FIGURE 4-10), click the Remove Server tab.
3. In server list at the top of the dialog, select the server to be removed.
4. Click the Remove Server button to remove the server, and click the Close button to exit the dialog.

Editing RADIUS Server Information

Editing information of a RADIUS server involves changing the configuration of a RADIUS server.

FIGURE 4-11 Edit Radius Server Information



Server Address	UDP Port	Server Type
10.0.0.15	1812	Device
10.116.72.abcd	1812	
guithunder.org	1812	

To edit information of a RADIUS server, do the following:

1. Open the faceplate display, open the Switch menu, and select Radius Servers.

2. In the Radius Server Information dialog (FIGURE 4-11), click the Edit Server tab.

3. In the server list at the top of the dialog, select the server to be edited.

4. Make changes to the IP Address, UDP Port, Timeout, Retries, or Secret field.

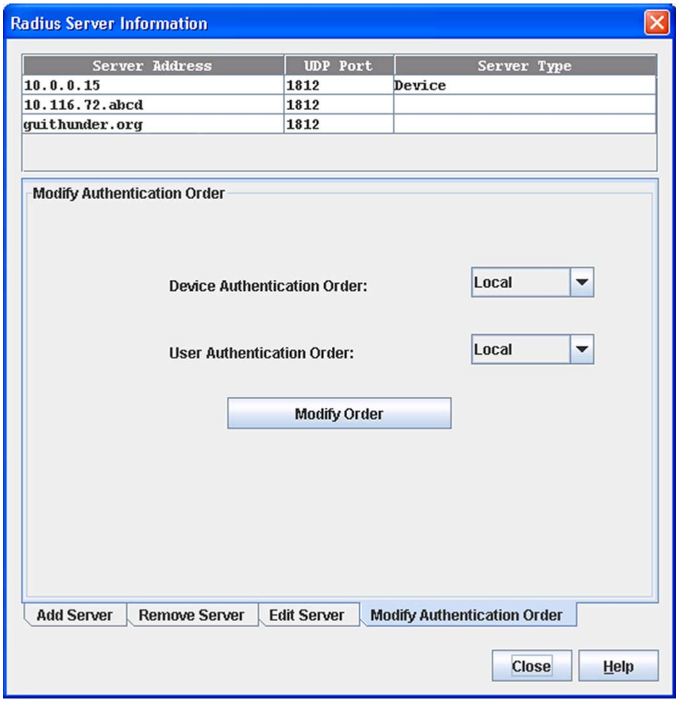
5. Select the server type (Device, User, Account) and Sign Packets options.

6. Click the Edit Server button to save the changes, and click the Close button to exit the dialog.

Modifying Authentication Order RADIUS Server Information

Editing information of a RADIUS server involves changing the configuration of a RADIUS server.

FIGURE 4-12 Modify Authentication Order - Radius Server Information



Radius Server Information

Server Address	UDP Port	Server Type
10.0.0.15	1812	Device
10.116.72.abcd	1812	
guithunder.org	1812	

Modify Authentication Order

Device Authentication Order: Local

User Authentication Order: Local

To modify the authentication order information of a RADIUS server, do the following:

1. Open the faceplate display, open the Switch menu, and select Radius Servers.
2. In the Radius Server Information dialog (FIGURE 4-12), click the Modify Authentication Order tab.
3. In server list at the top of the dialog, select the server to be modified.
4. Make changes to the Device Authentication Order or User Authentication Order drop-down lists. Select one of the following:
   - **Local** — only attempts to authenticate using local switch password database.

- **RADIUS** — only attempts to authenticate using the RADIUS server (another computer that provides authentication).
- **RADIUS Local** — attempts to authenticate using the RADIUS server. If the switch can not contact the RADIUS server due to a network or some other problem, the switch will authenticate using the local password database.

5. Click the Modify Order button to save the changes, and click the Close button to exit the dialog.

CHAPTER 5

Managing Switches

This section describes the following tasks that manage switches in the fabric.

- Managing User Accounts
- Displaying Switch Information
- Configuring Port Threshold Alarms
- Paging a Switch
- Setting the Date/Time and Enabling NTP Client
- Resetting a Switch
- Configuring a Switch
- Managing Switch Stacks
- Archiving a Switch
- Restoring a Switch
- Testing a Switch
- Restoring the Factory Default Configuration
- Configuring the Network
- Configuring SNMP
- Downloading a Support File
- Installing Feature License Keys
- Installing Firmware
- Using Call Home

Managing User Accounts

Only the Admin account can manage user accounts with the User Account Administration dialogs. However, any user can modify their own password. To open the User Account Administration dialogs, open the Switch menu in the faceplate display, and select User Accounts. A user account consists of the following:

- Account name or login
- Password
- Authority level
- Expiration date

Switches come from the factory with the following user accounts:

TABLE 5-1 Factory User Accounts

Account Name	Password	Admin Authority	Expiration
admin	password	true	never expires
images	images	false	never expires

The Admin account is the only user that can manage all user accounts with the User Account Administration dialogs. The Admin account can create, remove, modify user accounts, and change account passwords. The Admin account can also view and modify the switch and its configuration with Enterprise Fabric Suite 2007. The Admin account can not be removed.

Users with Admin authority can view and modify the switch and its configuration using Enterprise Fabric Suite 2007. Users without Admin authority are limited to viewing switch status and configuration.

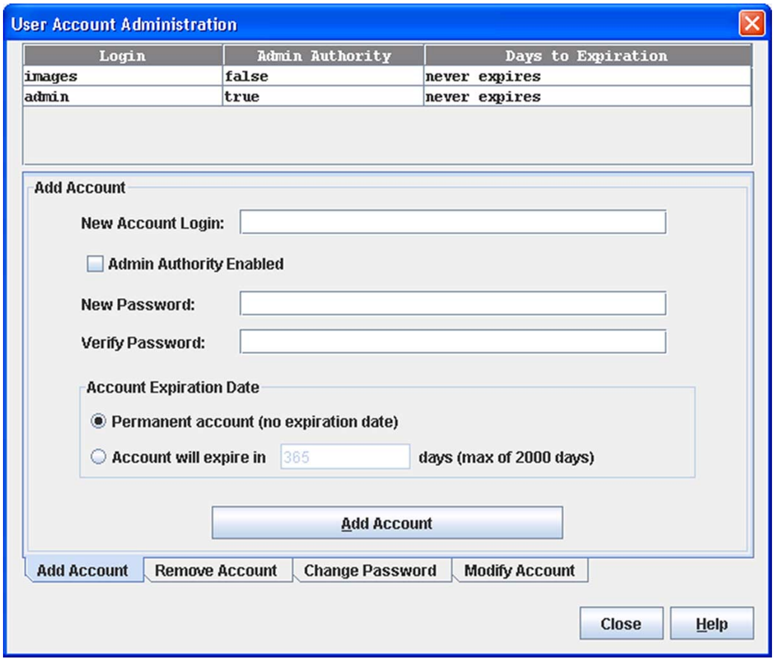
The Images account is used to exchange files with the switch using FTP. The Images account can not be removed.

Note – If the same user account exists on a switch and its RADIUS server, that user can login with either password, but the authority and account expiration will always come from the switch database.

Creating User Accounts

To create a user account on a switch, open the Switch menu in the faceplate display and select User Accounts. This displays the User Account Administration dialog (FIGURE 5-1). A switch can have a maximum of 15 user accounts.

FIGURE 5-1 User Account Administration Dialog – Add Account



User Account Administration

Login	Admin Authority	Days to Expiration
images	false	never expires
admin	true	never expires

Add Account

New Account Login:

□ Admin Authority Enabled

New Password:

Verify Password:

Account Expiration Date

● Permanent account (no expiration date)

○ Account will expire in 365 days (max of 2000 days)

1. To open the User Account Administration dialogs, open the Switch menu in the faceplate display, and select User Accounts.

2. Click the Add Account tab to open the Add Account tab page.

3. Enter an account name in the New Account Login field. Account names are limited to 15 characters. The first character must be alphanumeric.

4. If the account is to have the ability to modify switch configurations, select the Admin Authority Enabled option.

5. Enter a password in the New Password field and enter it again in the Verify Password field. A password must have a minimum of 8 characters and no more than 20.

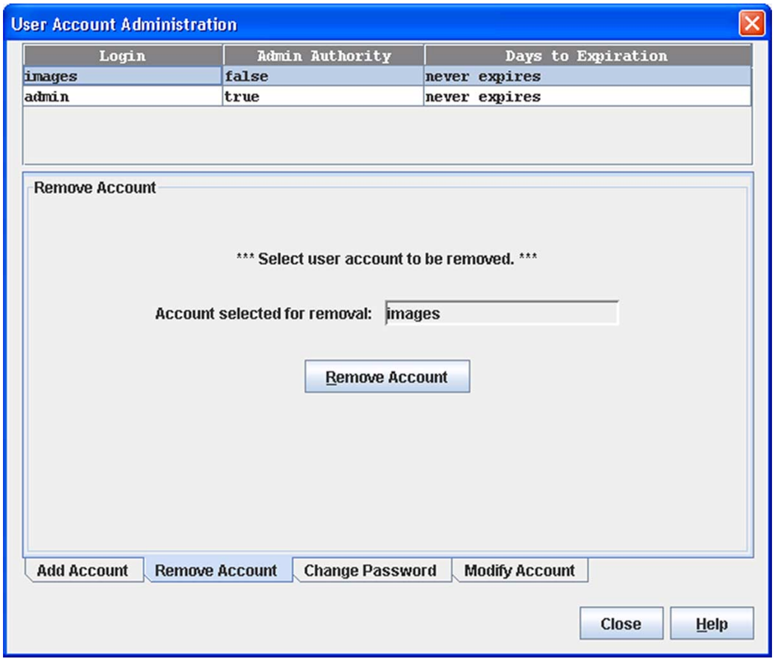
6. If this account is to be permanent with no expiration date, select the Permanent Account option. Otherwise, click the Account Will Expire button and enter the number days in which the account will expire.

7. Click the Add Account button to add the newly defined account.

Removing a User Account

To remove a user account on a switch, open the Switch menu in the faceplate display and select User Accounts. Click the Remove Account tab in the User Account Administration dialog to present the display (FIGURE 5-2). Select the account name from the list of accounts at the top of the dialog and click the Remove Account button.

FIGURE 5-2 User Account Administration Dialog – Remove Account



User Account Administration

Login	Admin Authority	Days to Expiration
images	false	never expires
admin	true	never expires

Remove Account

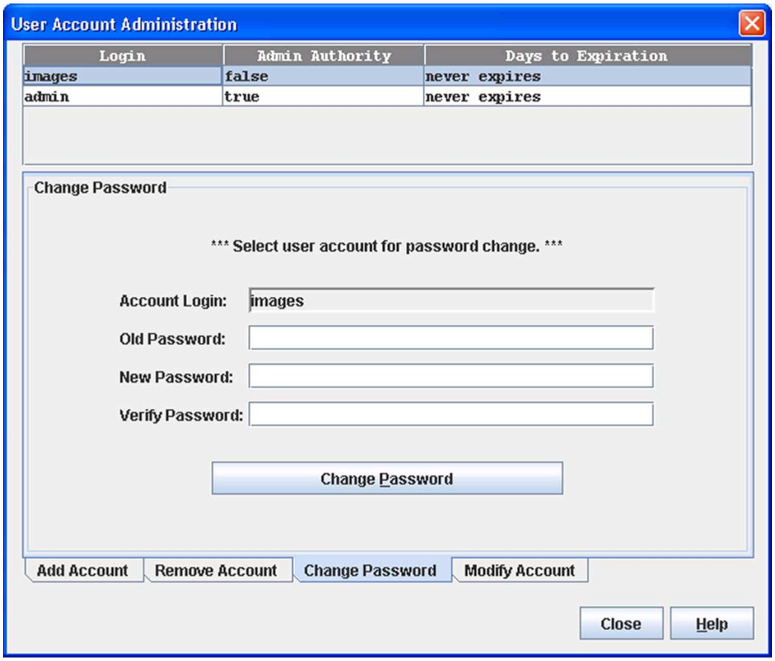
*** Select user account to be removed. ***

Account selected for removal: images

Changing a User Account Password

To change the password for an account on a switch, open the Switch menu in the faceplate display and select User Accounts. Click the Change Password tab in the User Account Administration dialog to present the display (FIGURE 5-3). Select the account name from the list of accounts at the top of the dialog, then enter the old password, the new password, and verify the new password in the corresponding fields. Click the Change Password button. Any user can change their password for their account, but only the Admin account name can change the password for another user's account. If the administrator does not know the user's original password, the administrator must remove the account and then recreate it as a new account.

FIGURE 5-3 User Account Administration Dialog – Change Password



Login	Admin Authority	Days to Expiration
images	false	never expires
admin	true	never expires

*** Select user account for password change. ***

Account Login: images

Old Password:

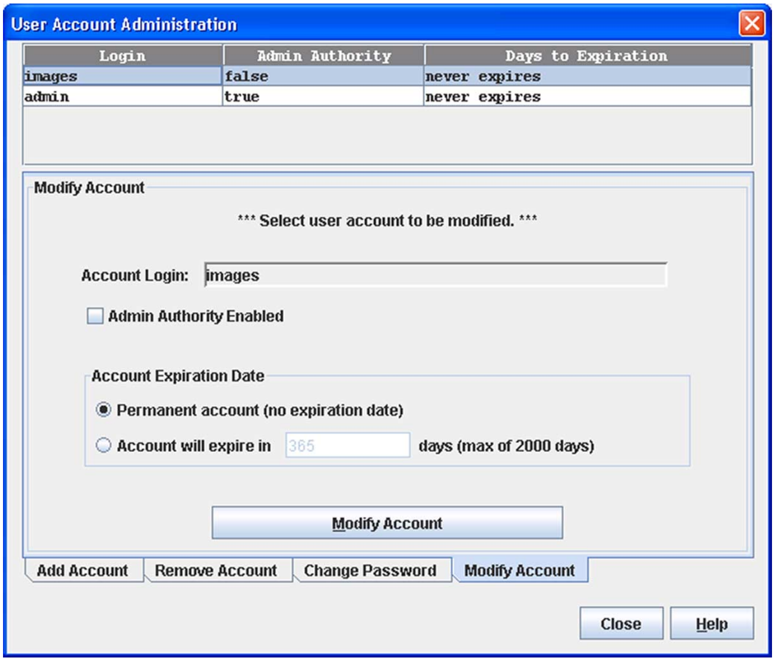
New Password:

Verify Password:

Modifying a User Account

To modify a user account on a switch, open the Switch menu in the faceplate display and select User Accounts. Click the Modify Account tab in the User Account Administration dialog to present the display (FIGURE 5-4). Select the account name from the list of accounts at the top of the dialog. Select the Admin authority Enabled option to grant admin authority to the account name. Select an Account Expiration Date option. If the account is not to be permanent, enter the number of days until the account expires. Click the Modify Account button to save the changes. Click the Close button to close the User Account Administration dialog.

FIGURE 5-4 User Account Administration Dialog – Modify Account



User Account Administration

Login	Admin Authority	Days to Expiration
images	false	never expires
admin	true	never expires

Modify Account

*** Select user account to be modified. ***

Account Login: images

□ Admin Authority Enabled

Account Expiration Date

● Permanent account (no expiration date)

○ Account will expire in 365 days (max of 2000 days)

Displaying Switch Information

The faceplate and backplate displays and data windows provide the following switch information:

- Device and HBA information
- Switch specifications and addresses

- Configuration parameters
- Port information and performance statistics
- Configured zone sets
- Configured and active security
- Link information
- Mouse-overs display popup-like information when you rest the cursor over key elements, such as ports, blades, and LEDs.

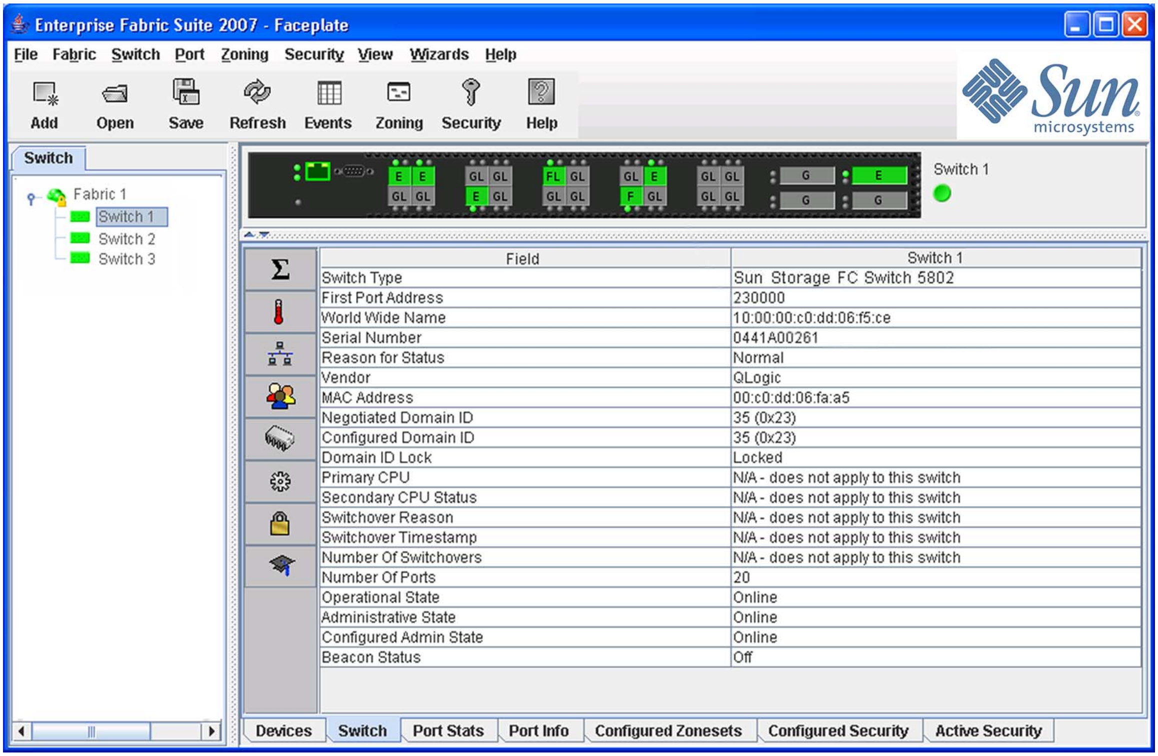
The fabric updates the topology and faceplate displays by forwarding changes in status to the management workstation as they occur. You can allow the fabric to update the switch status, or you can refresh the display at any time. To refresh switch status in the display, do one of the following:

- Click the Refresh button.
- Open the View menu and select Refresh.
- Press the F5 key.
- Right-click a switch in the topology display and select Refresh Switch from the popup menu.
- Right-click in the graphic window of the faceplate display, and select Refresh Switch from the popup menu.

Switch Data Window

The Switch data window (FIGURE 5-5) displays current information for the selected switches. Information in the Switch data window is grouped and viewed by the Summary, Status, Network, User Login, Firmware, Services, Zones/Security, and Advanced buttons. Click a button to display the corresponding information in the data window on the right.

FIGURE 5-5 Switch Data Window



Field	Switch 1
Switch Type	Sun Storage FC Switch 5802
First Port Address	230000
World Wide Name	10:00:00:c0:dd:06:f5:ce
Serial Number	0441A00261
Reason for Status	Normal
Vendor	QLogic
MAC Address	00:c0:dd:06:fa:a5
Negotiated Domain ID	35 (0x23)
Configured Domain ID	35 (0x23)
Domain ID Lock	Locked
Primary CPU	N/A - does not apply to this switch
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Switchover Timestamp	N/A - does not apply to this switch
Number Of Switchovers	N/A - does not apply to this switch
Number Of Ports	20
Operational State	Online
Administrative State	Online
Configured Admin State	Online
Beacon Status	Off

Refer to “Configuring a Switch” on page 122 for more information about the Switch data window. To open the Switch data window, select one or more switches in the topology display or open the faceplate display, and click the Switch tab below the window.

FIGURE 5-6 Switch Data Window Buttons

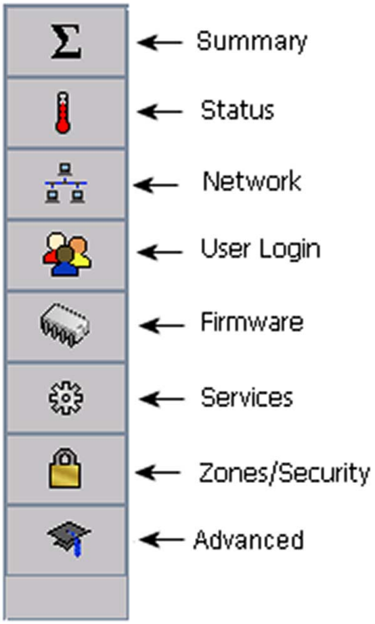


TABLE 5-2 describes the Switch data window entries.

TABLE 5-2 Switch Data Window Entries

Entry	Description
Summary Group	
Switch Type	Switch model
First Port Address	Switch Fibre Channel address
World Wide Name	Switch world wide name
Serial Number	Number assigned to each chassis.
Reason for Status	The reason for the operational state.
Vendor	Switch manufacturer
MAC Address	Media Access Control address
Negotiated Domain ID	The domain ID currently being used by the switch in the fabric
Configured Domain ID	The domain ID defined by network administrator that persists across switch resets
Domain ID Lock	Domain ID lock status. Prevents (True) or permits (False) dynamic domain ID reassignment.

TABLE 5-2 Switch Data Window Entries *(Continued)*

Entry	Description
Primary CPU	N/A - does not apply to this switch
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Switchover Timestamp	N/A - does not apply to this switch
Number of Switchovers	N/A - does not apply to this switch
Number of Ports	Number of ports activated on the switch
Operational State	Switch operational state: Online, Offline, Diagnostic, Down
Administrative State	Current switch administrative state
Configured Admin State	Switch administrative state that is stored in the switch configuration
Beacon Status	Beacon status. Switch LEDs are blinking (On) or not (Off).
Status Group	
Operational State	Switch operational state: Online, Offline, Diagnostic, Down
Administrative State	Current switch administrative state
Configured Admin State	Switch administrative state that is stored in the switch configuration
Beacon Status	Beacon status. Switch LEDs are blinking (On) or not (Off).
Reason for Status	The reason for the operational state.
Secondary CPU Status	N/A - does not apply to this switch
Switchover Reason	N/A - does not apply to this switch
Temperature	Internal switch temperature (°C)
Fan 1 Status	Fan 1 status
Fan 2 Status	Fan 2 status
Fan 3 Status	N/A - does not apply to this switch
Power Supply 1 Status	Power supply 1 status
Power Supply 2 Status	Power supply 2 status
Temperature Failure Port Shutdown	Non-configurable (always enabled for this switch). All ports are downed when the switch temperature exceeds the Failure Temperature.

TABLE 5-2 Switch Data Window Entries *(Continued)*

Entry	Description
Warning Temperature	Non-configurable temperature threshold (65° Celsius) above which a warning condition alarm is generated.
Failure Temperature	Non-configurable temperature threshold (70° Celsius) above which a failure condition alarm is generated.
POST Status	Status from the most recent Power On Self Test (Passed, Failed, Compromised (implies one or two bad ports)).
POST Fault Code	Fault code from the most recent Power On Self Test. An 8 digit hex code that Sun Microsystems personnel can use to identify the type of failure.
Test Status	The current diagnostic test status of switch.
Test Fault Code	The code value for the last recorded diagnostic test status recorded on the switch.
Network Group	
IPv4 Enabled	Internet Protocol version 4 Enabled status
IPv4 Address	Mask that determines the IP address subnet
IPv4 Subnet Mask	Mask that determines the IP address subnet
IPv6 Gateway	Gateway address
IPv6 Enabled	Internet Protocol version 6 Enabled status
IPv6 Address	Mask that determines the IP address subnet
IPv6 Gateway	Gateway address
CPU0 MAC Address	NA-does not apply to this switch
CPU1 MAC Address	NA-does not apply to this switch
SNMP Enabled	SNMP enabled or disabled
SNMP v3 Security Enabled	SNMP v3 Security enabled or disabled
Broadcast Support	Broadcast support status. Broadcast support is enabled (default) or disabled.
NTP Client Enabled	Enabled or disabled. Allows for switches to synchronize their time to a centralized server.
NTP Server Address	The IP address of the centralized NTP server. Ethernet connection to NTP server is required.
DNS Enabled	DNS Enabled status

TABLE 5-2 Switch Data Window Entries *(Continued)*

Entry	Description
Configured Local Hostname	Hostname for the switch. If a fully qualified domain name is given, the domain suffix is used as the first suffix in the DNS search list for DNS lookups performed by the switch.
IPv6 Assigned Address (1-20)	The set of IPv6 addresses assigned by DHCPv6, NDP, or the switch administrator.
User Login Group	
User Name	Account name
Login Level	Authority level
Super User	Super user privileges enabled/disabled
UserAuthentication Enabled	Enforcement of account names and authority (always True)
Firmware Group	
Firmware Version	Active firmware version
Inactive Firmware Version	This field does not apply to this switch
Pending Firmware Version	Firmware version that will be activated at the next reset
PROM/Boot Version	PROM firmware version
Services Group	
NTP Client Enabled	Enabled or disabled. Allows for switches to synchronize their time to a centralized server.
NTP Server Address	The IP address of the centralized NTP server. Ethernet connection to NTP server is required.
FDMI Enable	Fabric Device Management Interface status. If enabled, device information can be obtained, managed, and saved through the fabric using Name Service Management Server functions. Enterprise Fabric Suite 2007 will report all FDMI information reported by the entry switch, if FDMI is enabled on the entry switch.
FDMI HBA Entry Limit	Maximum number of HBAs that can be registered with a switch.
Embedded GUI Enabled	QuickTools™ web applet for Sun FC switches and directors status. Enables or disables the web applet on the switch.
Inactivity Timeout	Number of minutes the switch waits before terminating an idle command line interface session. Zero (0) disables the time out threshold.

TABLE 5-2 Switch Data Window Entries *(Continued)*

Entry	Description
GUI Mgmt Enabled	Out-of-band management application status. If disabled, the switch cannot be managed out-of-band using applications such as Enterprise Fabric Suite 2007 or QuickTools.
Telnet Enabled	Telnet client status
SSH Enabled	Secure Shell status. If enabled, an encrypted data path is provided for command line interface sessions.
SSL Enabled	Secure Sockets Layer status. If enabled, encryption for switch management web applet and CIM sessions is provided.
CIM Enabled	Common Interface Model status. The CIM agent is based on the SNIA Storage Management Initiative Specification (SMI-S), which is the standard for SAN management in a heterogeneous environment.
FTP Enabled	FTP status
Management Server Enabled	Management server status.
SNMP Enabled	SNMP enabled or disabled.
Call Home Enabled	Call Home status. If enabled and configured, switches can send alerts and events to pagers and Email. Users can configure the type of events and where the alerts are sent.
Zones/Security Group	
Merge Auto Save	Zoning auto save status. If enabled, any zoning updates from the fabric will be saved in permanent (non-volatile) memory as well as temporary memory. If disabled, any zoning updates from the fabric will be saved only in temporary memory and will be lost after a switch reset.
Zoning Default Visibility	Permits (All) or prevents (None) communication with other switches in the absence of an active zone set. This feature is only configurable with previous firmware versions.
Default Zone	Disables communication between ports and devices not defined in the active zone set, or when there is no active zone set.
Discard Inactive	Automatically removes the previously active zone set when a zone set is activated on a switch.

TABLE 5-2 Switch Data Window Entries *(Continued)*

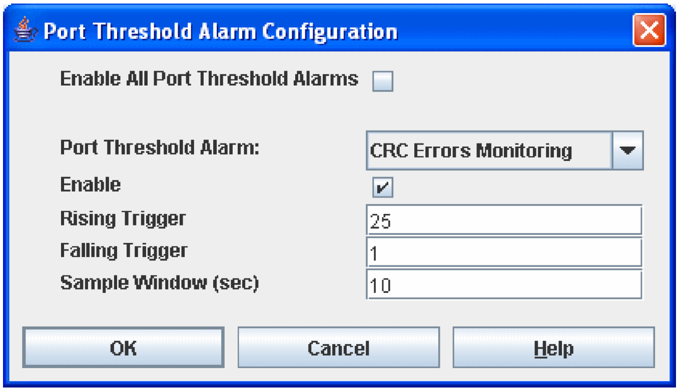
Entry	Description
Implicit Hard Zoning	Introduces hardware enforcement of zoning regardless of type. All zones and all supported zone member types will have hardware enforcement.
Security Auto Save	If enabled, the security configuration is saved to non-volatile memory on the switch. If disabled, the security file is saved only to temporary memory. The Auto Save feature is used when Fabric Binding is enabled. When Auto Save is disabled, any updates from remote switches will not be saved locally.
Security Fabric Binding Enable	If enabled, it is required that the expected domain ID of a switch be verified before being allowed to attach to the fabric.
Advanced Group	
R_A_TOV	Resource allocation timeout value
E_D_TOV	Error detect timeout value
Number of Donor Groups	Total number of donor port groups. A donor group is a set of ports on a switch that can donate buffer credits to each other.
Inactivity Timeout	Number of minutes the switch waits before terminating an idle command line interface session. Zero (0) disables the time out threshold.
In-band Enabled	N/A - does not apply to this switch
Principal Switch	N/A - does not apply to this switch

Configuring Port Threshold Alarms

You can configure the switch to generate alarms for selected events. Configuring an alarm involves choosing an event type, rising and falling triggers, a sample window, and finally enabling or disabling the alarm. To configure port threshold alarms, do the following:

1. In the faceplate display, open the Switch menu and select Port Threshold Alarm Configuration. The Port Threshold Alarm Configuration dialog (FIGURE 5-7) prompts you to enable or disable all alarms, select an event, set triggers, set a sample window and enable or disable an individual alarm.

FIGURE 5-7 Port Threshold Alarm Configuration Dialog



Port Threshold Alarm Configuration

Enable All Port Threshold Alarms □

Port Threshold Alarm: CRC Errors Monitoring

Enable ☑

Rising Trigger 25

Falling Trigger 1

Sample Window (sec) 10

2. Select the Enable All Port Threshold Alarms option to enable monitoring for all the individual alarm types that are enabled. The Enable All Port Threshold Alarms option is the master control for the individual alarms. For example, the switch will monitor CRC errors only if both the CRC Error Enable and Enable All Port Threshold Alarms options are selected.

3. Select an event type from the Port Threshold Alarm drop-down list. Choose from the following options:
   - CRC error monitoring
   - Decode error monitoring
   - ISL monitoring
   - Login monitoring
   - Logout monitoring
   - Loss of signal monitoring

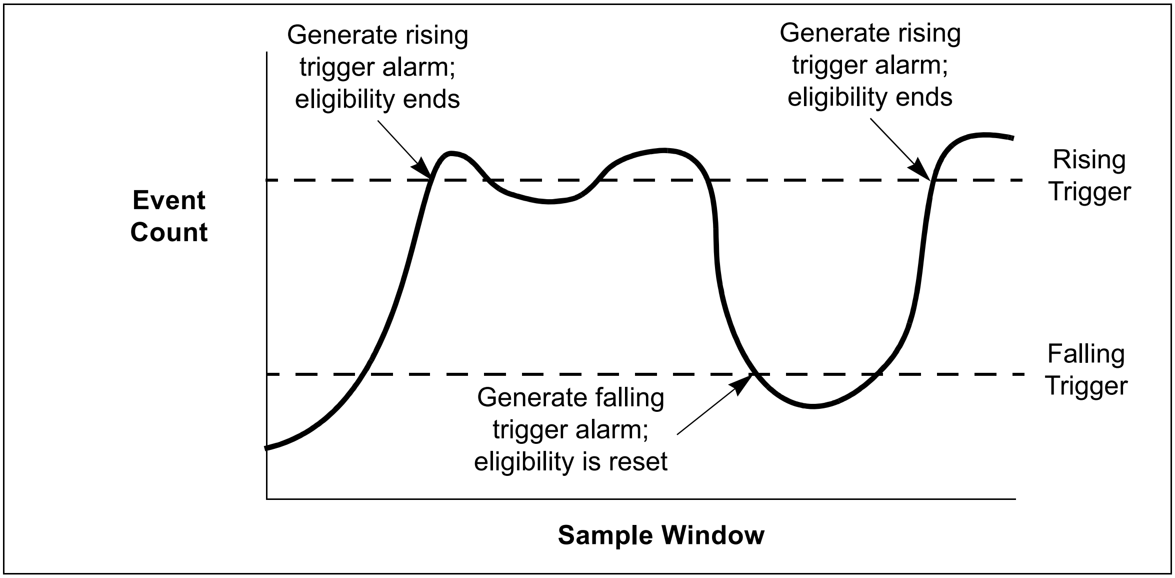
4. Select the Enable option to make the alarm eligible for use.

5. Enter a value for the rising trigger. A rising trigger alarm is generated when the event count per interval exceeds the rising trigger. The switch will not generate another rising trigger alarm for that event until the count descends below the falling trigger and rises again above the rising trigger. Consider the example in .

6. Enter a value for the falling trigger. A falling trigger alarm is generated when the event count per interval descends below the falling trigger.

Note – The switch will down a port if a rising trigger alarm is not cleared after three consecutive sample windows.

FIGURE 5-8 Port Threshold Alarm Example


Generate rising trigger alarm; eligibility ends
Generate rising trigger alarm; eligibility ends
Event Count
Rising Trigger
Falling Trigger
Generate falling trigger alarm; eligibility is reset
Sample Window

7. Enter a sample window in seconds. The sample window defines the period of time in which to count events.

8. Repeat steps 3 through 7 for each alarm you want to configure or enable.

9. Click the OK button to save all changes.

Paging a Switch

You can use the beacon feature to page a switch. The beacon feature causes all Logged-In LEDs to flash, making it easier to recognize. To page a switch, open the Switch menu in the faceplate display and select Toggle Beacon. To cancel the beacon, reselect Toggle Beacon.

Setting the Date/Time and Enabling NTP Client

The Date/Time dialog allows you to manually set the date, time, and time zone on a switch, or to enable NTP (Network Time Protocol) Client to synchronize the date and time on the switch with an NTP server. Enabling the NTP client requires an Ethernet connection to an NTP server, but ensures the consistency of date and time stamps in alarms and log entries. When the date/time is set or displayed in the firmware, it is always in Universal Time. However, when displayed in the Date/Time dialog, the value is always in local time. If the NTP Client Enabled option is selected (default is un-selected), the Date and Time areas becomes inactive, thus preventing you from manually setting the date and time on the switch. The NTP Server Discovery and NTP Server IP Address fields become active, and allow you to select a discovery method (Static, DHCP, DHCPv6) and to specify an IP address (IPv4 or IPv6).

Note – The difference between switch and workstation times must not exceed 24 hours, or the switch management application can not connect using SSL.

To manually set the date and time on a switch, do the following:

1. Open the Switch menu, and select Set Date/Time.
2. In the NTP area of the Date/Time dialog, clear (un-select) the NTP Client Enabled option. The fields in the Date and Time areas become active.
3. Enter the day, year, hour, and minutes.
4. Select a month and time zone from the drop-down lists.
5. Click the OK button. The new date and time take effect immediately.

To synchronize the date and time on the switch with an NTP server, do the following:

1. Open the Switch menu, and select Set Date/Time.
2. In the NTP area of the Date/Time dialog, select the NTP Client Enabled option. The fields in the Date and Time areas become in-active.
3. Select a time zone from the Select Time Zone drop-down list.
4. Select an NTP Server Discovery option from the drop-down list.
5. Enter an NTP Server IP Address.

6. Click the OK button.

Resetting a Switch

Resetting a switch reboots the switch using configuration parameters in memory. Depending on the reset type, a switch reset may or may not include a power-on self test or it may or may not disrupt traffic. TABLE 5-3 describes the types of switch resets.

TABLE 5-3 Switch Resets

Type	Description
Hot Reset	Resets a switch without a Power On Self Test. This reset activates the pending firmware, but does not disrupt switch traffic. If errors are detected on a port during a hot reset, the port is reset automatically. Refer to "Installing Firmware" on page 155 for more information about non-disruptive firmware activation.
Reset	Resets a switch without a Power On Self Test. This reset activates the pending firmware and it is disruptive to switch traffic.
Hard Reset	Resets a switch with a Power On Self Test. This reset activates the pending firmware and it is disruptive to switch traffic.

Note – If performing a Reset or a Hard Reset, the support files, the firmware image files that have not been unpacked, and the configuration backup files that were created on the switch will be deleted.

To reset a switch using Enterprise Fabric Suite 2007, do the following:

1. Select the switch to be reset and open the faceplate display.
2. Open the Switch menu and select the Reset Switch drop-down list:
   - Select Hot Reset to perform a hot reset.
   - Select Reset to perform a standard reset.
   - Select Hard Reset to perform a hard reset.

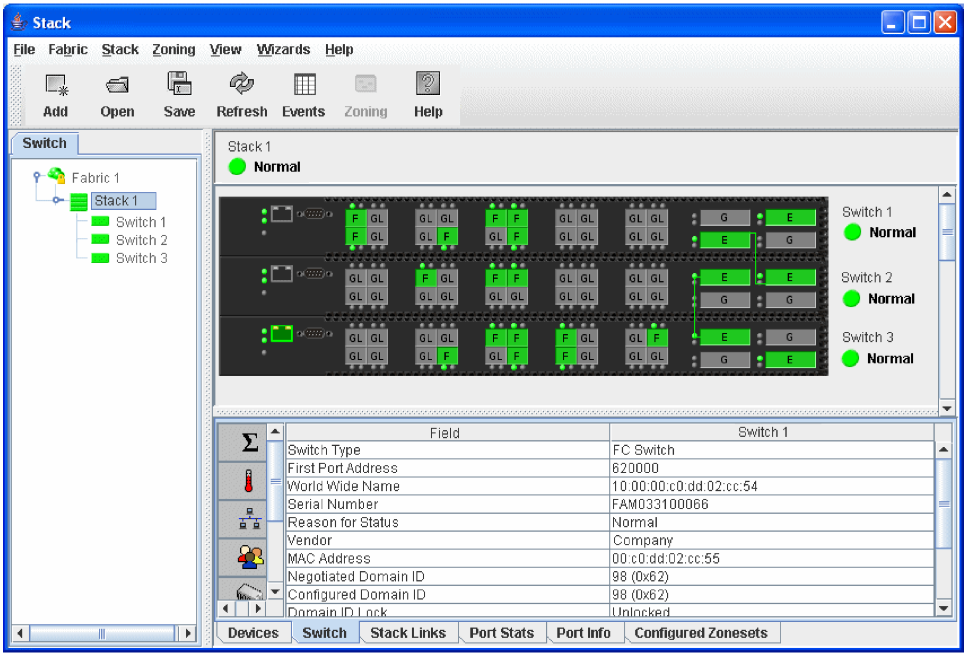
Managing Switch Stacks

Enterprise Fabric Suite 2007 recognizes switches as a stack if they are connected by their high speed stacking ports. The switch management application will auto-detect switches connected by their 10/20-Gbit/sec ports and display these stacked switches as a single stack entity in the topology and faceplate displays.

The graphic window (upper right pane of the faceplate display) displays one faceplate image for each switch in the stack.

In the fabric tree (left window pane), the switches in each stack are nested under the stack icon, which is nested under the fabric icon. Expanding the fabric and stack icons in the fabric tree displays all switches in a stack. The lock image on the fabric icon indicates that the application is communicating with the fabric through a secure (Secure Sockets Layer) connection.

FIGURE 5-9 Switch Stacks



Field	Switch 1
Switch Type	FC Switch
First Port Address	620000
World Wide Name	10:00:00:c0:dd:02:cc:54
Serial Number	FAM033100066
Reason for Status	Normal
Vendor	Company
MAC Address	00:c0:dd:02:cc:55
Negotiated Domain ID	98 (0x62)
Configured Domain ID	98 (0x62)
Domain ID Lock	Unlocked

The stack dialogs are essentially the same as their corresponding switch dialogs, except for the Select Switch for Initial Configuration pull-down menu is added to each dialog. The stack dialogs display the information for the switch selected in the Select Switch for Initial Configuration pull-down menu. Choose another switch in the pull-down menu to display information for that switch. The switch configuration displayed is the configuration that will be applied to all other switches in the stack after you click the OK button. The following operations are available to configure the stack as a single entity:

- Date/time and Network Time Protocol (NTP) settings. Refer to "Setting the Date/Time and Enabling NTP Client" on page 119 for more information.
- Firmware load and activation. Refer to "Installing Firmware" on page 155 for more information.
- Switch reset. Refer to "Resetting a Switch" on page 120 for more information.
- Editing user accounts. Refer to "Managing User Accounts" on page 104 for more information.
- Security Consistency Checklist. Refer to "Security Consistency Checklist" on page 79 for more information.
- SNMP configuration. Refer to "Configuring SNMP" on page 149 for more information.
- Syslog configuration. Refer to "Syslog" on page 125 for more information.

Additional stack operations include:

- Move the selected switch up or down one position in the stack within the graphic window. To move a switch image up or down, select a switch, open the Stack menu, and select Move Switch Up or Move Switch Down.
- Remove a switch from being associated with the stack if the switch is not connected to any other switch in the fabric with an ISL connection. To remove a switch from a stack, select a switch, open the Stack menu, and select Remove Switch.
- Refresh the stack to update the faceplate display with current information for all switches in the stack
- Select all ports on all switches in the stack

Configuring a Switch

Switch configuration is divided into three areas: chassis configuration, network configuration, and SNMP configuration. Chassis configuration specifies switch-wide Fibre Channel settings. Network configuration specifies IP settings, remote logging, and the NTP client. SNMP configuration specifies SNMP settings and traps.

You can configure a switch explicitly or you can use the Configuration Wizard. The Configuration Wizard is a series of dialogs that guide you through the chassis, network, and SNMP configuration steps on new or replacement switches.

Using the Configuration Wizard

The Configuration Wizard is a series of dialogs you can use to configure the IP address and other basic parameters on new or replacement switches. The application will detect the first time use and present the Initial Start dialog, from which the Configuration Wizard can be launched. You can also launch the Configuration Wizard from the Wizards menu in either the topology display or the faceplate display. Open the Wizards menu and select Configuration Wizard. Use the Configuration Wizard to configure a new switch in a fabric.

Note – You can utilize unused donor ports with the Extended Credit Wizard only when pointing to a switch running firmware that supports this feature. Refer to "Using the Extended Credits Wizard" on page 186 for more information.

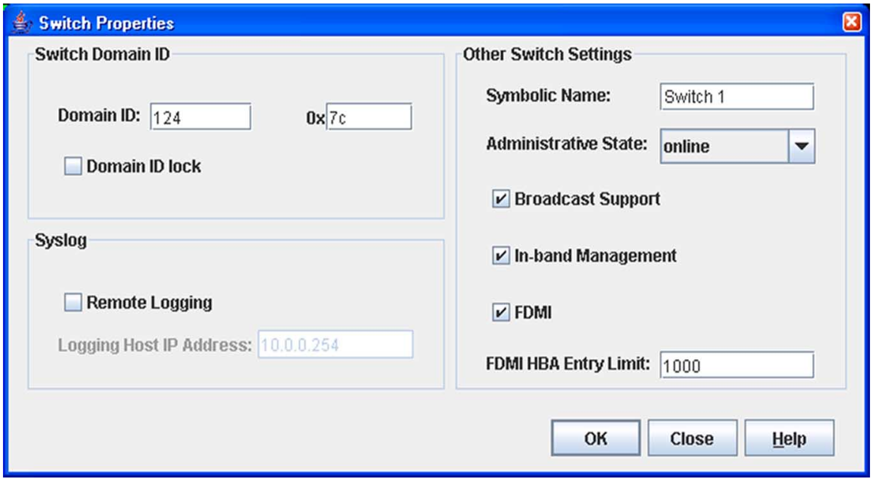
Switch Properties

Use the Switch Properties dialog (FIGURE 5-10) to change the following switch configuration parameters:

- Domain ID and Domain ID Lock
- Syslog
- Symbolic Name
- Switch Administrative States
- Broadcast Support
- In-band Management
- Fabric Device Management Interface

To open the Switch Properties dialog, either select a switch in the topology display or open the faceplate/backplate display for the switch you be configuring, and then open the Switch menu and select Switch Properties. You may also right-click a switch graphic in the topology display or faceplate/backplate displays, and select Switch Properties from the popup menu.

FIGURE 5-10 Switch Properties Dialog



Switch Domain ID

Domain ID: 124 0x 7c

□ Domain ID lock

Syslog

□ Remote Logging

Logging Host IP Address: 10.0.0.254

Other Switch Settings

Symbolic Name: Switch 1

Administrative State: online

☑ Broadcast Support

☑ In-band Management

☑ FDMI

FDMI HBA Entry Limit: 1000

Domain ID and Domain ID Lock

The domain ID is a unique Fibre Channel identifier for the switch. The Fibre Channel address consists of the domain ID, port ID, and the Arbitrated Loop Physical Address (ALPA). The maximum number of switches within a fabric is 239, with each switch having a unique domain ID.

Switches come from the factory with the domain IDs unlocked. This means that if there is a domain ID conflict in the fabric, the switch with the highest principal priority, or the principal switch, will reassign any domain ID conflicts and establish the fabric. If you lock the domain ID on a switch and a domain ID conflict occurs, one of the switches will isolate as a separate fabric and the Logged-In LEDs on both switches will flash to show the affected ports. Refer to the Set Config Switch command in the *Sun Storage Fibre Channel Switch 5802 Command Line Interface Guide* for information and the Domain ID Lock and Principal Priority parameters.

If you connect a new switch to an existing fabric with its domain ID unlocked, and a domain conflict occurs, the new switch will isolate as a separate fabric. However, you can remedy this by resetting the new switch or taking it offline then back online. The principal switch will reassign the domain ID and the switch will join the fabric.

Note – Domain ID reassignment is not reflected in zoning that is defined by domain ID and port number pair. You must reconfigure zones that are affected by domain ID reassignment.

Syslog

The Syslog (Remote Logging) feature enables saving of the log information to a remote host that supports the syslog protocol. When enabled, the log entries are sent to the syslog host at the IP address that you specify in the Logging Host IP Address field. Log entries are saved in the internal switch log whether this feature is enabled or not.

To save log information to a remote host, you must edit the syslog.conf file (located on the remote host) and then restart the syslog daemon. Consult your operating system documentation for information on how to configure Remote Logging. The syslog.conf file on the remote host must contain an entry that specifies the name of the log file in which to save error messages. Add the following line to the syslog.conf file. A <tab> separates the selector field (local0.info) and action field which contains the log file path name (/var/adm/messages/messages.name).

```
local0.info <tab> /var/adm/messages.name
```

Symbolic Name

The symbolic name is a user-defined name of up to 32 characters that identifies the switch. The symbolic name is used in the topology and faceplate displays, as well as many data windows to more easily identify switches. The illegal characters are the pound sign (#), semi-colon (;), and comma (,).

Switch Administrative States

The switch administrative state determines the operational state of the switch. The switch administrative state exists in two forms: the configured administrative state and the current administrative state.

- Configured administrative state — the state that is saved in the switch configuration and is preserved across switch resets. Enterprise Fabric Suite 2007 always makes changes to the configured administrative state. The configured administrative state is displayed in the Switch Properties dialog.
- Current administrative state — the state that is applied to the switch for temporary purposes and is not retained across switch resets. The current administrative state is set using the Set Switch command. Refer to the *Sun Storage Fibre Channel Switch 5802 Command Line Interface Guide* for more information.

TABLE 5-4 describes the administrative state values.

TABLE 5-4 Switch Administrative States

Parameter	Description
Online	The switch is available.
Offline	The switch is unavailable.
Diagnostics	The switch is in diagnostics mode, is unavailable, and tests can then be run on all ports of the switch.

Broadcast Support

Broadcast is supported on the switch which allows for TCP/IP support. Broadcast is implemented using the proposed standard specified in *Multi-Switch Broadcast for FC-SW-3, T11 Presentation Number T11/02-031v0*. Fabric Shortest Path First (FSPF) is used to set up a fabric spanning tree used in transmission of broadcast frames. Broadcast frames are retransmitted on all ISLs indicated in the spanning tree and all online N_Ports and NL_Ports. Broadcast zoning is supported with hard zones. When a broadcast frame is received, these hard zones are enforced at the N_Ports and NL_Ports. If the originator of the broadcast is in a hard zone, the frame is retransmitted on all online N_Ports and NL_Ports within the hard zone. If the originator of the broadcast frame is not in a hard zone, the frame is retransmitted on online N_Ports and NL_Ports that are not in a hard zone. The default setting is enabled.

In-band Management

In-band management is the ability to manage switches across inter-switch links using Enterprise Fabric Suite 2007, SNMP, management server, or the application programming interface. The switch comes from the factory with in-band management enabled. If you disable in-band management on a particular switch, you can no longer communicate with that switch by means other than a direct Ethernet or serial connection.

Fabric Device Management Interface

Fabric Device Management Interface (FDMI) provides a means to gather and display device information from the fabric, and allows FDMI capable devices to register certain information with the fabric, if FDMI is enabled. Enterprise Fabric Suite 2007 will report all FDMI information reported by the entry switch, if FDMI is enabled on the entry switch. To view FDMI data, FDMI must be enabled on the entry switch and on all other switches in the fabric which are to report FDMI data.

FDMI is comprised of the fabric-to-device interface and the application-to-fabric interface. The fabric-to-device interface enables a device's management information to be registered. The application-to-fabric interface provides the framework by which an application obtains device information from the fabric. Use the FDMI HBA Entry Limit field on the Switch Properties dialog to configure the maximum number of HBAs that can be registered with a switch. If the number of HBAs exceeds the maximum number, the FDMI information for those HBAs can not be registered.

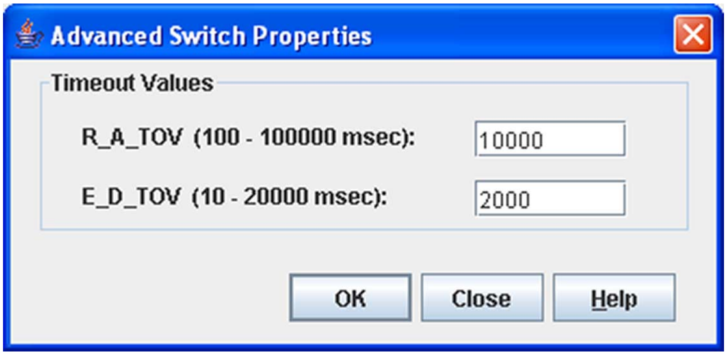
Select the FDMI option on the Switch Properties dialog to enable or disable FDMI. If FDMI is enabled on an HBA, the HBA forwards information about itself to the switch when the HBA logs into the switch. If FDMI is enabled on a switch, the switch stores the HBA information in its FDMI database. Disabling FDMI on a switch clears the FDMI database. If you disable FDMI on a switch, then re-enable it, you must reset the ports to cause the HBAs to log in again, and thus forward HBA information to the switch.

To view detailed FDMI information for a device, open the topology display, click the Devices tab, and click the (i) button in the Details column of the Devices data window. The Detailed Device Display dialog displays the specific information for that device. Refer to "Devices Data Window" on page 40 and "Displaying Detailed Device Information" on page 49 for more information.

Advanced Switch Properties

The Advanced Switch Properties dialog (FIGURE 5-11) allows you to set the timeout values. The Advanced Switch Properties dialog is available for only the entry switch. The switch will automatically be taken offline temporarily and will be restored to its original state after the changes are completed. To open the Advanced Switch Properties dialog, open the Switch menu and select Advanced Switch Properties. After making changes, click the OK button to put the new values into effect.

FIGURE 5-11 Advanced Switch Properties Dialog


Advanced Switch Properties

Timeout Values

R_A_TOV (100 - 100000 msec): 10000

E_D_TOV (10 - 20000 msec): 2000

Timeout Values

The switch timeout values determine the timeout values for all ports on the switch. The timeout values must be the same for all switches in the fabric.

- R_A_TOV (Resource Allocation Timeout) — the maximum time a frame could be delayed and still be delivered. The default is 10000 milliseconds.
- E_D_TOV (Error Detect Timeout) — the maximum round trip time that an operation between two N_Ports could require. The default is 2000 milliseconds.

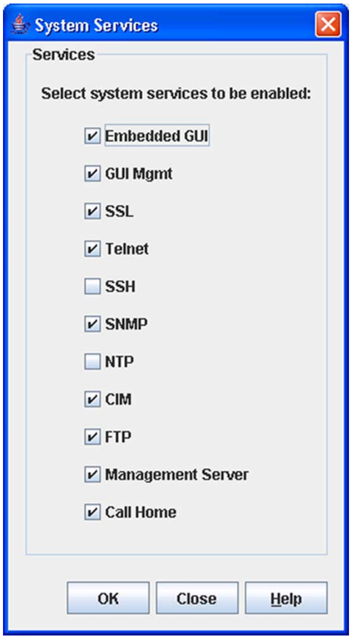
Note – Mismatched timeout values will disrupt the fabric. These should not be changed unless absolutely necessary. The switch is temporarily placed offline to change these values.

Managing System Services

The System Services dialog (FIGURE 5-12) provides a central location for you to enable or disable any of the external user services such as Simple Network Management Protocol (SNMP), Secure Sockets Layer (SSL), Secure SHell (SSH), embedded switch management application, command line interface, Network Time Protocol (NTP), Common Interface Model (CIM) and Call Home. To display the System Services dialog, open the Switch menu and select Services.

Note – System services requiring you to enter an IP address are dependant on the settings of the IPv4 Network and IPv6 Network options in the Network Properties IP dialog. If both options are disabled, all services except SSL and Management Server will be disabled.

FIGURE 5-12 System Services Dialog



System Services

Services

Select system services to be enabled:

☑ Embedded GUI
☑ GUI Mgmt
☑ SSL
☑ Telnet
□ SSH
☑ SNMP
□ NTP
☑ CIM
☑ FTP
☑ Management Server
☑ Call Home

Note – Use caution when disabling the Embedded GUI, GUI Mgmt, Telnet, SSL, and SSH, as it is possible to disable all access to the switch except through a serial connection.

- Embedded GUI (Graphical User Interface) — allows users to point a browser at the switch and run the QuickTools web applet.
- GUI Mgmt — allows out-of-band management of the switch with Enterprise Fabric Suite 2007. If disabled, the switch can not be specified as the entry switch for a fabric in the Enterprise Fabric Suite 2007, but can still be managed through an in-band connection.
- SSL (Secure Sockets Layer) — provides secure encrypted communications between the switch management application (GUI) and the switch. SSL must be enabled for configuration of security and RADIUS servers with the switch management application (GUI). SSL certificates are generated on the switch with the switch date/time and validated with the workstation's date/time. If

the switch and workstation date/time are not in sync, invalid certificates will be generated and prevent an SSL connection from being established between the switch and switch management application (GUI). To disable SSL when using a user authentication RADIUS server, the RADIUS authentication order must first be set to Local.

- Telnet (command line interface) — allows users to manage the switch through a Telnet command line interface session. Disabling Telnet access to the switch is not recommended.
- SSH (Secure SHell) — provides secure encrypted Telnet command line interface sessions with the switch. Note that you will have to have an SSH client running on your workstation in order to manage your switch with Telnet command line interface when SSH is enabled.
- SNMP (Simple Network Management Protocol) — allows management of the switch through third-party applications that use SNMP.
- NTP (Network Time Protocol) — allows the switch to obtain its time and date settings from an NTP server. Configuring all of your switches and your workstations to utilize NTP will keep their date/time settings in sync and will prevent difficulties with SSL certificates and event logs.
- CIM (Common Interface Model) — allows management of the switch through third-party applications that use CIM.
- FTP (File Transfer Protocol) — allows file transfers to the switch via FTP. FTP is required for out-of-band firmware uploads which will complete faster than in-band Firmware uploads.
- Management Server — allows management of the switch through third-party applications that use GS-3 Management Server.
- Call Home — allows users to configure their switches to send alerts and events to pagers and Email. Users can configure the type of events and where the alerts are sent.

Archiving a Switch

You can create an .XML archive file containing the configuration parameters. Basically any data received by Enterprise Fabric Suite 2007 is archived. This archive file can be used to restore the configuration on the same switch or on a replacement switch. You can also use the archive file as a template for configuring new switches to add to a fabric. Passwords are not archived. Security Group secrets are not included in the archive and must be reconfigured using the CLI after a restore.

Archived parameters include the following:

- Switch properties and statistics

- IP configuration
- SNMP configuration
- Nicknames
- Port properties and statistics
- Name server
- Date/Time and NTP settings
- Alarm configuration
- Zoning configuration
- Call Home parameters
- User account information (but not restored)
- Configured security, excluding group primary and secondary secrets (only with SSL connection to the switch)
- RADIUS Server information (only with SSL connection to the switch)

To archive a switch, do the following:

1. Open the Switch menu in the faceplate display and select Archive.
2. In the Save dialog, enter a file name.
3. Click the Save button.

Restoring a Switch

Restoring a switch loads the archived switch configuration parameters to the switch. The administrative state of the switch must be set to “offline” using the Switch Properties dialog before an archive can be used in the restore process. Refer to “Archiving a Switch” on page 130 for more information.

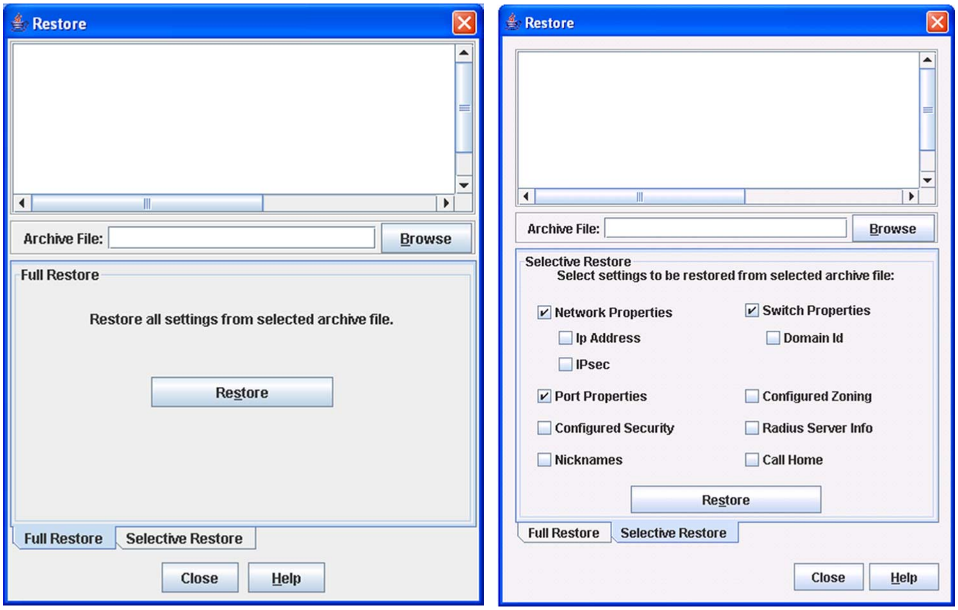
Caution – The switch being restored should be physically disconnected from the fabric. Restoring a switch in a fabric can severely disrupt the fabric. After the restore process is complete, the switch can be reconnected to the fabric.

To restore a switch, do the following:

1. Log in to the fabric through the switch you want to restore. You cannot restore a switch over an ISL.

2. Open the Switch menu in the faceplate display and select Restore to display the Restore dialog (FIGURE 5-13). The Restore dialog offers a Full Restore and a Selective Restore tab.

FIGURE 5-13 Restore Dialogs – Full and Selective



Restore all settings from selected archive file.

Select settings to be restored from selected archive file:

☑ Network Properties	☑ Switch Properties
☐ Ip Address	☐ Domain Id
☐ IPsec	
☑ Port Properties	☐ Configured Zoning
☐ Configured Security	☐ Radius Server Info
☐ Nicknames	☐ Call Home

3. Enter the archive file name or browse for the file. This archive file must be one that was produced by the Enterprise Fabric Suite 2007 Archive function. Configuration backup files created with the Config Backup command, using the command line interface, are not compatible with the Enterprise Fabric Suite 2007 Restore function.

4. To restore all configuration settings, click the Full Restore tab, then click the Restore button. To restore selected configuration settings, click the Selective Restore tab and select one or more of the following options, then click the Restore button.

   - **Network Properties** — restores all settings presented in the Network properties dialog except the IP address. Refer to “Network Properties” on page 137.
   - **IP Address** — restores switch IP address in addition to the other network properties.
   - **Port Properties** — restores all settings presented in the Port properties dialog. Refer to “Configuring Ports” on page 181.
   - **Configured Security** — restores all security sets in the switch database, except the active security set. Group primary and secondary secrets are not restored.

- **Nicknames** — restores the last saved nickname configuration.
- **Switch Properties** — restores all settings presented in the Switch properties dialog except the domain ID. Refer to "Switch Properties" on page 123. Additional settings that are restored when this option is enabled include other dialogs: Blade Properties, Port Threshold Alarm Configuration, System Services, and Date/Time dialog.
- **Domain ID** — restores switch domain ID in addition to the other switch properties.
- **Configured Zoning** — restores all configured zone sets, zones, and aliases in the switch's zoning database excluding the active zone set.
- **Radius Server** — restores all RADIUS server information defined in the switch database.
- **Call Home** — restores all Call Home configuration and profiles settings.

5. If you select the Configured Zoning or Full Restore option and the file contains zone sets, a dialog prompts you to activate one of those zone sets. Click the Yes button and select a zone set from the drop-down list in the Select Zone Set to be Activated dialog, or click the No button to avoid activating a zone set.

6. Click the OK button and view the results in the top pane of the Restore dialog.

Testing a Switch

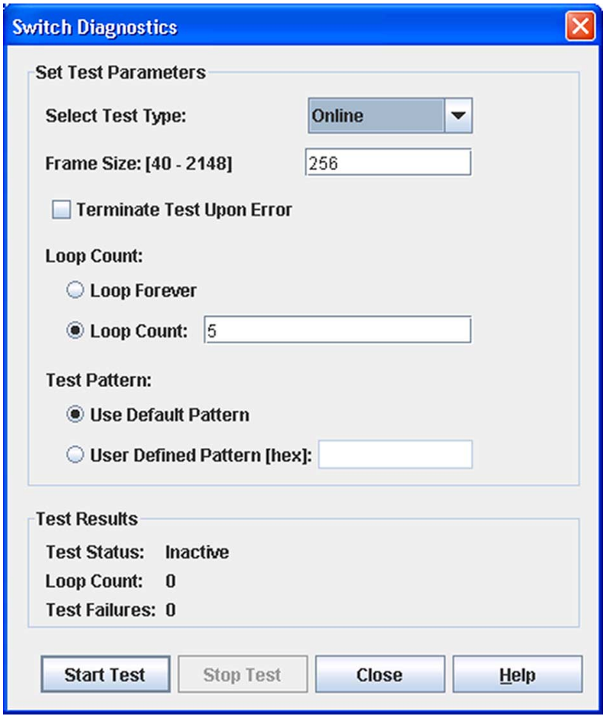
The switch diagnostic tests verify correct switch operation by sending a frame out through the loop, and then verifying that the frame received matches the frame that was sent. Only one switch can be tested at a time for each type of test.

The Switch Diagnostics dialog (FIGURE 5-14) allows you to test and verify operational status of switches (online and other states). To open the Switch Diagnostic dialogs, open the Switch menu, select Switch Diagnostics, and select Online Switch Diagnostics or Offline Switch Diagnostics.

The diagnostic tests are:

- **Online Test** — a non-disruptive test that exercises port-to-device connections for all ports that are online.
- **Offline Test** — a disruptive test that exercises all port connections for a switch in the diagnostics state.
- **Connectivity Tests** — a disruptive test that exercises all port and inter-port connections for a switch in the diagnostics state.

FIGURE 5-14 Switch Diagnostics Dialog



Switch Diagnostics

Set Test Parameters

Select Test Type: Online

Frame Size: [40 - 2148] 256

□ Terminate Test Upon Error

Loop Count:

○ Loop Forever

● Loop Count: 5

Test Pattern:

● Use Default Pattern

○ User Defined Pattern [hex]:

Test Results

Test Status: Inactive

Loop Count: 0

Test Failures: 0

To test a switch, do the following:

1. Open the faceplate display of the switch to be tested.
2. Open the Switch menu and select Switch Diagnostics, and select Online Switch Diagnostics or Other Switch Diagnostics to open the Switch Diagnostics dialog.
3. Select the test type in the pull-down menu.

Caution – If you selected the Other Switch Diagnostics option, your test type options are Offline and Connectivity. These tests will disrupt traffic. When you run an offline or connectivity test, the switch will be put into diagnostics state for you, and the switch will not be returned to its original state until the switch diagnostics dialog is closed. A disruptive switch reset will be done at that time to return the switch to its original state.

Caution – If you selected the Online Switch Diagnostics option to run the online switch test and there are no ports with an active login at that time, the test will return immediately with a Passed status.

---

4. Enter a frame size in the Frame Size field.
5. Enable or disable the Terminate Test Upon Error option.
6. Select a Loop Count option. The Loop Forever option runs the test until you click the Stop Test button. The Loop Count option runs the test a specific number of times.
7. Select the default test pattern or enter a user-defined (hexadecimal) test pattern.
8. Click the Start Test button to begin the next test. Observe the results in the Test Results area.

Note – If the Test Status field in the Test Results area indicates Failed, note the Test Fault Code displayed in the Switch data window and contact Tech Support.

Restoring the Factory Default Configuration

You can restore the switch and port configuration settings to the factory default values. To restore the factory configuration on a switch, open the Switch menu and select Restore Factory Defaults. TABLE 5-5 lists the factory default switch configuration settings.

Restoring the switch to the factory default configuration does not restore the account name and password settings. To restore user accounts, you must select the Reset User Accounts to Default option in the maintenance menu. Refer to "Recovering a Switch" in the Installation Guide for your switch for information about maintenance mode and the maintenance menu.

TABLE 5-5 Factory Default Configuration Settings

Setting	Value
Symbolic name	Switch
Administrative state	Online
Domain ID	1
Domain ID Lock	False
In-band Management	True
Broadcast Support	Enable
Resource Allocation Timeout (RA TOV)	10000 milliseconds
I/O Stream Guard	Disabled

TABLE 5-5 Factory Default Configuration Settings *(Continued)*

Setting	Value
Device Scan Enabled	True
Error Detect Timeout (ED TOV)	2000 milliseconds
SNMP Enabled	True
SNMP Proxy	True
IP address	10.0.0.1
FDMI Enabled	True
FDMI HBA Entry Level	1000
Subnet mask address	255.0.0.0
Gateway address	10.0.0.254
Network Discovery	Static
Remote Logging	False
Remote Logging host IP address	10.0.0.254
NTP Client Enabled	False
NTP Server IP Address	10.0.0.254
Contact	<sysContact undefined>
Location	<sysLocation undefined>
Trap enabled	False
Trap Port	162
Trap Address	Trap 1: 10.0.0.254; Traps 2-5: 0.0.0.0
Trap Community	Public
Read Community	Public
Write community	Private
Port State	Online
Port Speed	Auto-detect
Port Type	SFP ports = GL XPAK ports = G
Call Home Setup	<undefined>
Call Home Profile	<undefined>
Default Zone	Deny
Merge Auto Save	True
Discard Inactive	False

Configuring the Network

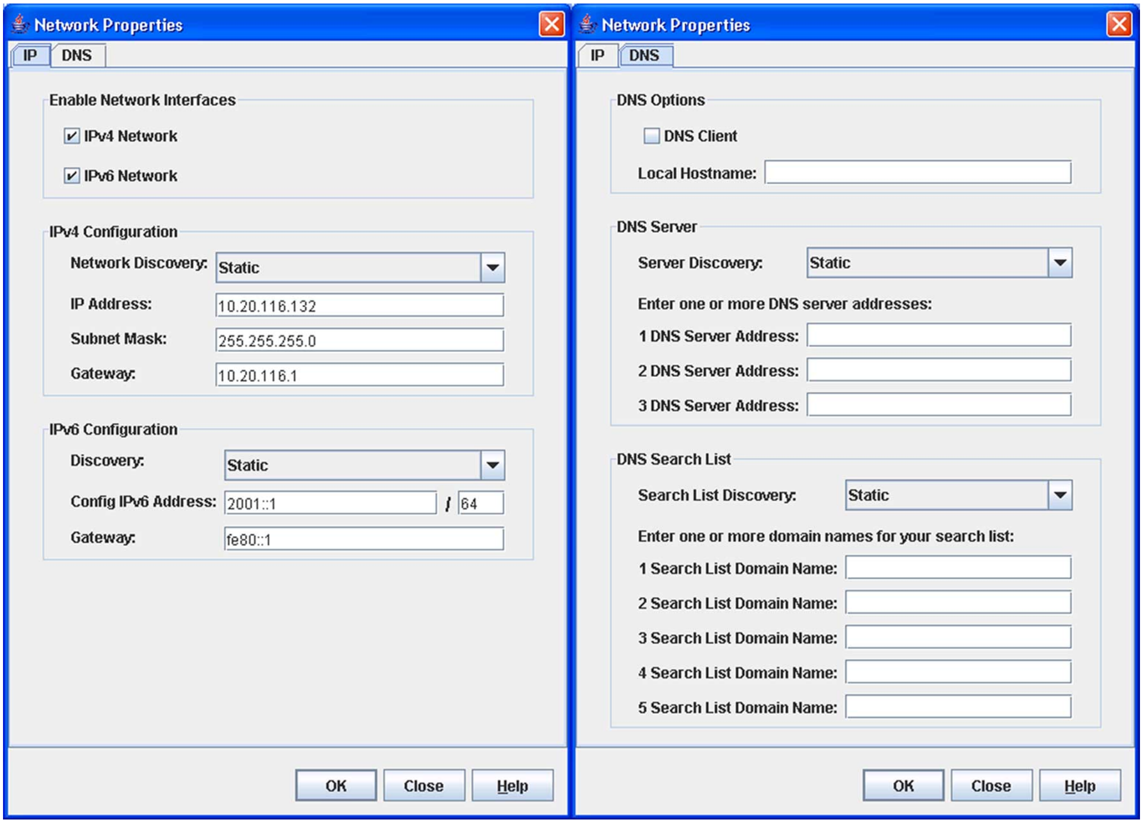
Configuring the network includes:

- Network Properties
  - Network IP Configuration
  - IPv4 and IPv6 Addressing
  - Network DNS (Domain Name Service) Configuration
- Network IP Security

Network Properties

Use the Network Properties dialogs (FIGURE 5-15) to configure IP and DNS parameters. To open the Network Properties dialog, select a switch in the topology display or open the faceplate/backplate display, open the Switch menu, select Network, and select Network Properties. The Network Properties dialog has two tabs: IP and DNS. Click the IP tab to open the Network Properties IP dialog. Click the DNS tab to open the Network Properties DNS dialog. After making changes, click the OK button to put the new values into effect.

FIGURE 5-15 Network Properties Dialogs



Enable Network Interfaces

☑ IPv4 Network

☑ IPv6 Network

IPv4 Configuration

Network Discovery: Static

IP Address: 10.20.116.132

Subnet Mask: 255.255.255.0

Gateway: 10.20.116.1

IPv6 Configuration

Discovery: Static

Config IPv6 Address: 2001::1 / 64

Gateway: fe80::1

DNS Options

☐ DNS Client

Local Hostname:

DNS Server

Server Discovery: Static

Enter one or more DNS server addresses:

1 DNS Server Address:

2 DNS Server Address:

3 DNS Server Address:

DNS Search List

Search List Discovery: Static

Enter one or more domain names for your search list:

1 Search List Domain Name:

2 Search List Domain Name:

3 Search List Domain Name:

4 Search List Domain Name:

5 Search List Domain Name:

Network IP Configuration

The IP configuration identifies the switch on the Ethernet network, determines which network discovery method to use, and enables/disables the IPv4 and IPv6 network addressing.

IPv4 and IPv6 Addressing

The firmware supports the IPv4 and IPv6 address families. An IPv4 address is 32 bits, and consists of four blocks of decimal numbers, with each block separated by a period. Each block can have up to three numbers. The single zero character displayed in a block represents all zeroes for that block. An example of an IPv4 address is 255.255.255.0. All four blocks contain numbers. TABLE 5-6 describes the IPv4 and IPv6 configuration parameters.

An IPv6 address allows for a much wider range of IP addresses assigned to a host than an IPv4 address. An IPv6 address is 128 bits, and consists of eight blocks of hexadecimal numbers, with each block separated by a colon. The maximum number of numerals in each block is four. One or more blocks with all zeroes are represented by two colon characters. The total number of blocks always adds up to eight. To determine how many contiguous blocks contain only zeroes, subtract the number of populated blocks from eight. For example, the IPv6 address 2eee::49:24:7a:54:3434 is equivalent to 2eee:0000:0000:49:24:7a:54:3434. The number of blocks containing zeroes in this example is two (8-6=2).

Note – Switches without IPv6 addressing enabled can not communicate over Ethernet with hosts or switches using the IPv6 addressing.

TABLE 5-6 Network Properties- IP Configuration

Parameter	Description
	Enable Network Interfaces
iPv4 Network	Enable this option to permit the IPv4 addressing "format" to be used anytime you are required to enter an IP address. **Caution -** Disabling this option will prevent you from using an IPv4 IP address for system services.
iPv6 Network	Enable this option to permit IPv6 addressing "format" to be used anytime you are required to enter an IP address. **Caution -** Disabling this option will prevent you from using an IPv6 IP address for system services.

TABLE 5-6 Network Properties- IP Configuration

Parameter	Description
	IPv4 Configuration
Network Discovery	Choose one of the following methods by which to assign the IP address: • **Static** — uses the IP configuration parameters entered in the Network Properties dialog. • **BootP** — acquires the IP configuration from a BootP server. If no IP address is obtained, the switch reverts to the previously configured IP address. • **RARP (Reverse Address Resolution Protocol)** — acquires the IP address from a RARP server. A RARP request is broadcast with up to three retries, each at 5 second intervals. If no IP address is obtained, the switch reverts to the previously configured IP address. • **DHCP (Dynamic Host Configuration Protocol)** — acquires the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address will be assigned to this switch in order to avoid an IP address conflict.
IP Address	Internet Protocol (IP) address for the Ethernet port. The default value is 10.0.0.1.
Subnet Mask	Subnet mask address for the Ethernet port. The default value is 255.0.0.0.
Gateway	IPv4 gateway address.

TABLE 5-6 Network Properties- IP Configuration

Parameter	Description
	IPv6 Configuration
Discovery	Choose one of the following methods by which to assign the IP address: • **Static** — uses the IP configuration parameters entered in the Network Properties dialog • **Dhcpv6 (Dynamic Host Configuration Protocol version 6)** — acquires the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address will be assigned to this switch in order to avoid an IP address conflict. • **Ndp** — Neighbor Discovery Protocol. Part of the Stateless Address Auto configuration protocol. It replaces the Address Resolution Protocol used with IPv4.
Config IPv6 Address	IPv6 address for the Ethernet port
Gateway	IPv6 gateway address

Network DNS Configuration

The Network Properties dialog has two tabs: IP and DNS. Click the **DNS** tab to open the Network Properties DNS dialog (FIGURE 5-15). Use the Network Properties DNS dialog to enable the DNS Client on the switch and the DNS server to map domain names to IP addresses. TABLE 5-7 describes the DNS configuration parameters.

TABLE 5-7 Network Properties - DNS Configuration

Parameter	Description
	DNS Options
DNS Client	Domain Name Service client
Local Hostname	Name of the local host

TABLE 5-7 Network Properties - DNS Configuration

Parameter	Description
	DNS Server
Server Discovery	Choose one of the following methods by which to assign the IP address: • **Static** — uses the IP configuration parameters entered in the Network Properties dialog. • **DHCP (Dynamic Host Configuration Protocol)** — acquires the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address will be assigned to this switch in order to avoid an IP address conflict. • **Dhcpv6 (Dynamic Host Configuration Protocol version 6)** — acquires the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address will be assigned to this switch in order to avoid an IP address conflict.
DNS Server Addresses	IP address of the DNS server
	DNS Search List
Search List Discovery	Choose one of the following methods by which to assign the IP address: • **Static** — uses the IP configuration parameters entered in the Network Properties dialog. • **DHCP (Dynamic Host Configuration Protocol)** — acquires the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address will be assigned to this switch in order to avoid an IP address conflict. • **Dhcpv6 (Dynamic Host Configuration Protocol version 6)** — acquires the IP configuration from a DHCP server. If no satisfactory lease is obtained, the DHCP client attempts to use the previously configured lease. If the previous lease cannot be used, no IP address will be assigned to this switch in order to avoid an IP address conflict.
Search List Domain Names	List of domain names that will be searched

Network IP Security

Network IP Security provides encryption-based security for IP version 4 and IP version 6 communications through the use of security policies and associations. The security policy database is the set of all security policies configured on the switch.

Security Policies

A security policy defines the following parameters:

- Connection source and destination
- Data traffic direction: inbound or outbound
- Protocols for which to protect data traffic
- Security protocols; Authentication Header (AH) or Encapsulating Security Payload (ESP)
- Level of protection: IP Security, discard, or none

Policies can define security for host-to-host, host-to-gateway, and gateway-to-gateway connections; one policy for each direction. For example, to secure the connection between two hosts, you need two policies: one for outbound traffic from the source to the destination, and another for inbound traffic to the source from the destination. You can specify sources and destinations by IP addresses (version 4 or 6) or DNS host names. If a host name resolves to more than one IP address, the switch creates the necessary policies and associations. You can recognize these dynamic policies and associations because their names begin with DynamicSP_ and DynamicSA_ respectively.

You can apply IP security to all communication between two systems, or to select protocols, such as ICMP, TCP, or UDP. Furthermore, instead of applying IP security, you can choose to discard all inbound or outbound traffic, or allow all traffic without encryption. Both the AH and ESP security protocols provide source authentication, ensure data integrity, and protect against replay.

Security Associations

A security association defines the encryption algorithm and encryption key to apply when called by a security policy. A security policy may call several associations at different times, but each association is related to only one policy. The security association database is the set of all security associations. IP Security configurations can be complex: it is possible to un-intentionally configure policies and associations that isolate a switch from all communication. If this happens, you can disable IP Security by placing the switch in maintenance mode, and correct the problem through the serial port interface.

Use the IPsec Configuration dialog to add IP security associations and policies. To open the IPsec Configuration dialog, open the Switch menu and select Network, and select IPv6 Ipsec Properties. Network IP Security (IP sec) consists of a suite of protocols for securing Internet Protocol (IP) communications by authenticating and/or encrypting each IP packet in a data stream. IPsec also includes protocols for cryptographic key establishment.

Note – The IPsec Configuration dialog is only available with a secure fabric and on the entry switch.

FIGURE 5-16 IPsec Configuration Dialog

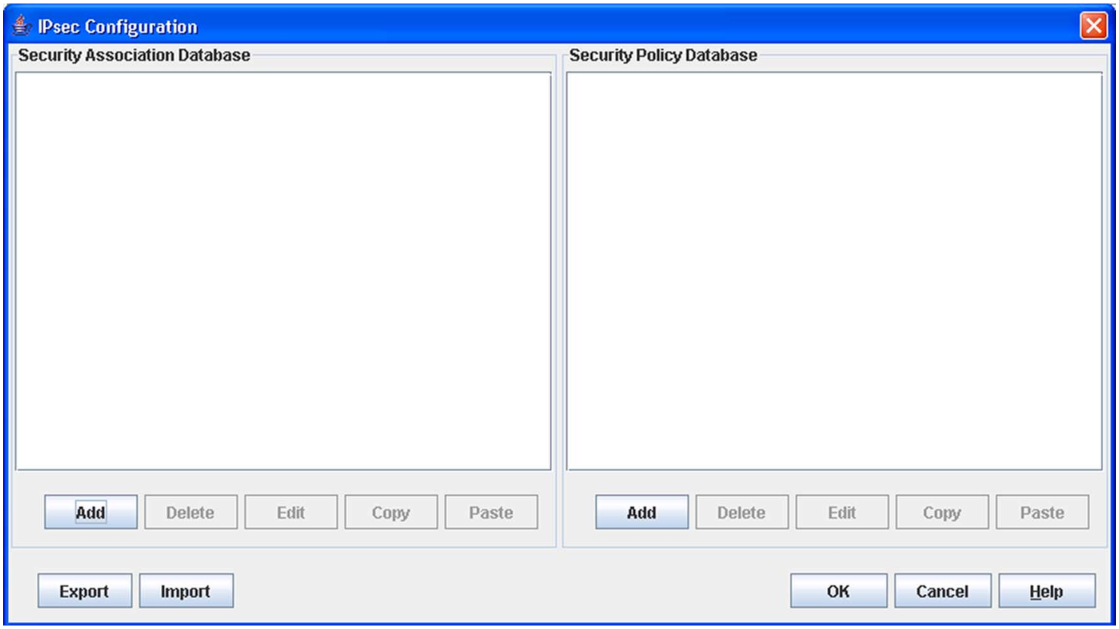


TABLE 5-8 describes the Network IP buttons in the IPsec Configuration dialog.

TABLE 5-8 IPsec Configuration Dialog Buttons

Button	Description
Add	Opens the Create IP Security Association dialog a in which to add a new IP security association. Opens the Create IP Security Policy dialog in which to add a new IP security policy.
Delete	Allows you to delete the selected IPsec association or policy.
Edit	Allows you to make changes to the selected IPsec association or policy.

TABLE 5-8 IPsec Configuration Dialog Buttons

Button	Description
Copy	Allows you to make a copy of the selected IPsec association or policy. This puts the association or policy into the clipboard. When you paste a copy, it is added to the list.
Paste	Pastes an IPsec association or policy from the clipboard. This makes a copy of the association or policy in the clipboard. The newly created associations must be edited to make them unique.
Export	Allows you to save the selected IPsec association/policy configuration to a file.
Import	Allows you to import an IPsec association or policy from a file.

Create IP Security Association Dialog

The Create IP Security Association dialog allows you to define a network IP security association.

FIGURE 5-17 Create IP Security Association Dialog

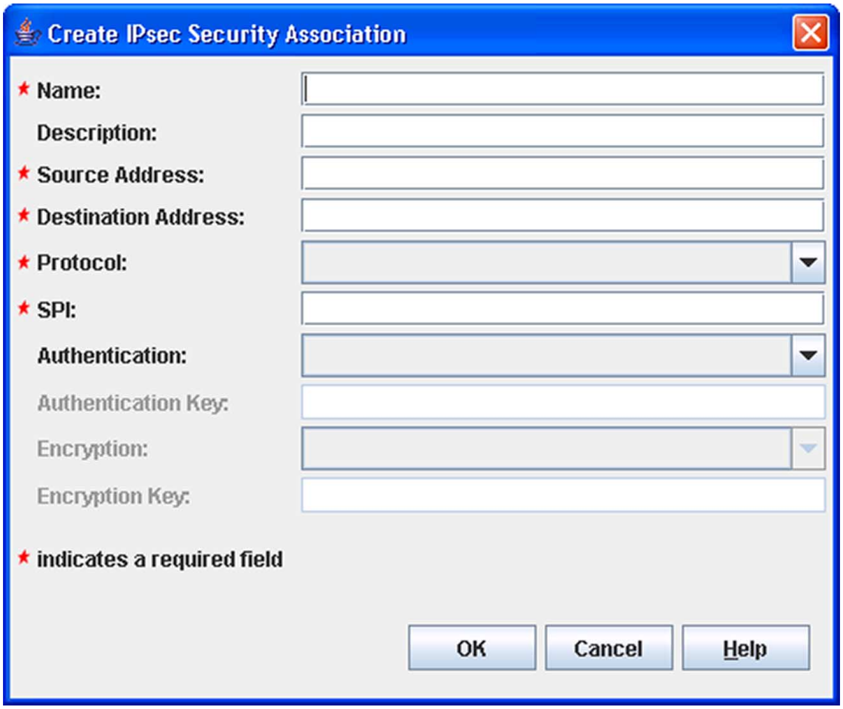


TABLE 5-9 describes the fields in the Create IP Security Association dialog.

TABLE 5-9 Create IP Security Association Dialog Fields

Field	Description
Name	The name you assign to the association
Description	The description of the association
Source Address	The IP address (version 4 or 6) or DNS host name of the host, switch, or gateway from which data originates.
Destination Address	The IP address (version 4 or 6) or DNS host name of the host, switch, or gateway receiving data. If you specified an IP address for the Source Address, the Destination Address must use the same IP version format.
Protocol	Protocol IP security protocol to be used to process data. The protocol can be one of the following: • Encapsulated Security Payload (esp) • Encapsulated Security Payload (esp-old) • Authentication Header (ah) • Authentication Header (ah-old)
SPI	Security parameters index number
Authentication	Authentication Algorithm to use to authenticate the source or destination. The authentication algorithm can be one of the following: • HMAC-MD5 • HMAC-SHA1 • HMAC-SHA256 • AES-XCBC-MAC
Authentication Key	Key string to use for authentication.
Encryption	• Algorithm that encrypts outbound data or decrypt inbound data. The encryption algorithm can be one of the following: • DES-CBC • 3DES-CBC
Encryption Key	Key string to use in encrypting or decrypting data.

Create IP Security Policy Dialog

The Create IP Security Policy dialog allows you to define a network IP security policy.

FIGURE 5-18 Create IP Security Policy Dialog

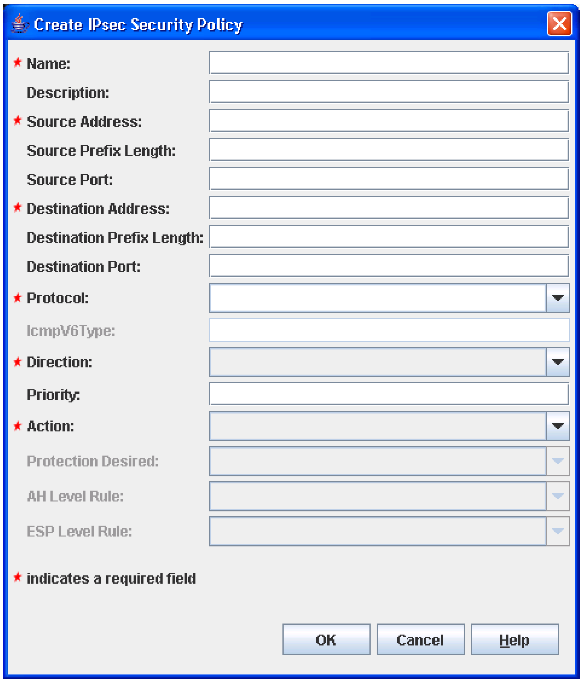


TABLE 5-10 describes the fields in the Create IP Security Policy dialog.

TABLE 5-10 Create IP Security Policy Dialog Fields

Field	Description
Name	Name of policy
Description	Description of policy
Source Address	Source port number (1–65535)
Source Prefix Length	Length of prefix in source address
Destination Address	IP address (version 4 or 6) or DNS host name of the host, switch, or gateway receiving data. If you specified an IP address for the SourceAddress, the DestinationAddress must use the same IP version format.
Destination Prefix Length	IPv4 or IPv6 subnet mask length. IPv4 [0..32], IPv6 [0..128]
Destination Port	Destination port number (1–65535)

TABLE 5-10 Create IP Security Policy Dialog Fields

Field	Description
Protocol	Protocol or application to which to apply IP security. Enter a keyword for one of the following protocols or an integer (0-255): • Internet Control Message Protocol for IP version 4 (ICMP) • Internet Control Message Protocol for IP version 6 (ICMPv6) • Internet Protocol, version 4 (IPv4) • Transmission Control Protocol (TCP) • User Datagram Protocol (UDP) • Any protocol • 0–255
IcmpV6Type	ICMP number (0–255) if the protocol is ICMPv6.
Direction	Direction of the data traffic to which to apply the policy: In — data entering the destination Out — data leaving the source
Priority	Controls the relative ordering of this policy within the SPD.
Action	Processing to apply to data traffic: • Discard — unconditionally disallow all inbound or outbound data traffic. • None — allow all inbound or outbound data traffic without encryption or decryption. • Ipsec — apply IP security to inbound and outbound data traffic.
Protection Desired	Type of IP security protection to apply: • AH — Authentication Header • ESP — Encapsulating Security Payload • Both — Apply both AH and ESP protection
ahRuleLevel	Rule level to apply for AH protection: • Default • Use — use IPsec if corresponding SAD entry found, don't use IPsec if corresponding SAD entry not found. • Require — use IPsec if corresponding SAD entry found, don't communicate at all if corresponding SAD entry not found.
espRuleLevel	Rule level to apply for ESP protection: • Default • Use • Require

Configuring SNMP

Configuring the Simple Network Management Protocol includes:

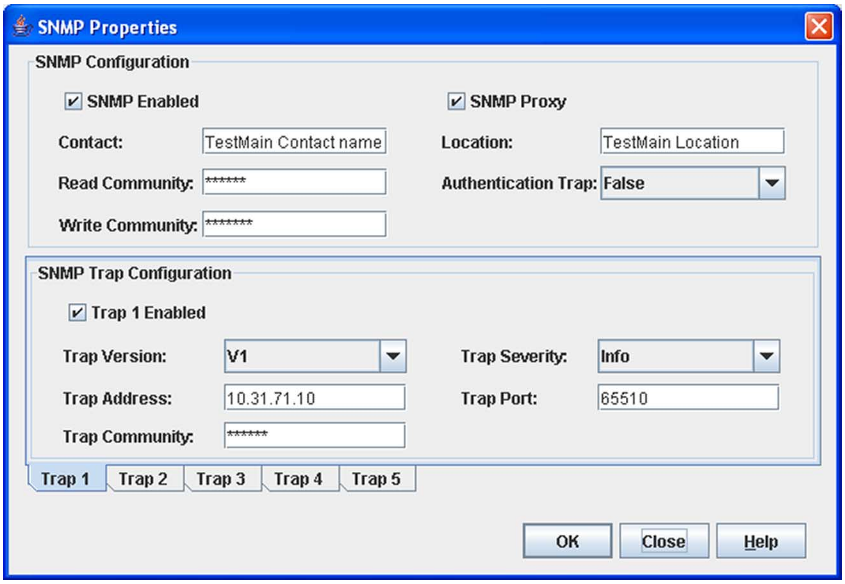
- SNMP Properties Configuration
- SNMP Trap Configuration
- SNMP v3 Manager and User Configuration

SNMP Properties

Use the SNMP Properties dialog (FIGURE 5-19) to change SNMP configuration parameters. To open the SNMP Properties dialog, select a switch in the topology display or open the faceplate/backplate display, open the Switch menu, select SNMP, and select SNMP Properties. After making changes, click the OK button to put the new values into effect.

Note – Since Read Community, Trap Community, and Write Community settings are like passwords and are write-only fields, the current settings are displayed as asterisks.

FIGURE 5-19 SNMP Properties Dialog



SNMP Properties

SNMP Configuration

☑ SNMP Enabled

☑ SNMP Proxy

Contact: TestMain Contact name

Location: TestMain Location

Read Community: ******

Authentication Trap: False

Write Community: *******

SNMP Trap Configuration

☑ Trap 1 Enabled

Trap Version: V1

Trap Severity: Info

Trap Address: 10.31.71.10

Trap Port: 65510

Trap Community: ******

SNMP Configuration

The SNMP configuration defines how authentication traps are managed.TABLE 5-11 describes the SNMP configuration parameters. The illegal characters for the user-defined fields are the pound sign (#), semi-colon (;), and comma (,).

TABLE 5-11 SNMP Configuration Parameters

Parameter	Description
SNMP Enabled	Enables or disables SNMP communication with other switches in the fabric. If disabled, the user cannot use an SNMP application at a workstation to talk to the switch that has this setting disabled.
Contact	Specifies the name (up to 64 characters) of the person who is to be contacted to respond to trap events. The default is “<sysContact undefined>”.
Read Community	Read community password (up to 32 characters) that authorizes an SNMP agent to read information from the switch. This is a write-only field. The value on the switch and the SNMP management server must be the same. The default is “public”.
SNMP Proxy	If enabled, you can use SNMP to monitor and configure any switch in the fabric.
Location	Specifies the name (up to 64 characters) for the switch location. The default is “<sysLocation undefined>”.
Authentication Trap	Enables or disables the reporting of SNMP authentication failures. If enabled, a notification trap is sent when incorrect community string values are used. The default value is False.
Write Community	Write community password (up to 32 characters) that authorizes an SNMP client to write information to the switch. This is a write-only field. The value on the switch and the SNMP management server must be the same. The default is “private”.

SNMP Trap Configuration

The SNMP trap configuration defines how traps are set. Choose from the tabs Trap1 – Trap 5 to configure each trap.

Note – The Trap Community string is now per trap, but only when pointing at a switch running 7.4 or newer firmware. With firmware older than 7.4, there is just one trap community string for all SNMP configuration.

TABLE 5-12 describes the SNMP configuration parameters.

TABLE 5-12 SNMP Trap Configuration Parameters

Parameter	Description
Trap Version	Specifies the SNMP version (1 or 2) with which to format traps.
Trap 1 Enabled	Enables or disables the trap. If disabled, traps are not sent to trap monitoring stations and the trap settings are not configurable.
Trap Address*	Specifies the IP address to which SNMP traps are sent. A maximum of 5 trap addresses are supported. The default address for trap 1 is 10.0.0.254. The default address for traps 2–5 is 0.0.0.0.
Trap Community	Trap community password (up to 32 characters) that authorizes an SNMP agent to receive traps. This is a write-only field. The value on the switch and the SNMP management server must be the same. The default is "public".
Trap Severity	Specifies a severity level to assign to the trap. Open the drop-down list and choose a level. The Trap 1 Enabled option on the SNMP Properties dialog must be enabled to access this drop-down list. Trap severity levels include Unknown, Emergency, Alert, Critical, Error, Warning, Notify, Info, Debug, and Mark
Trap Port[1]	Specifies the port number (between 1-65535) on which a trap is set. The default is 162.

* Trap address (other than 0.0.0.0) and trap port combinations must be unique. For example, if trap 1 and trap 2 have the same address, then they must have different port values. Similarly, if trap 1 and 2 have the same port value, they must have different addresses.

SNMP v3 Security

Simple Network Management Protocol Version 3 (SNMPv3) is an interoperable standards-based protocol for network management. SNMPv3 provides secure access to devices by a combination of authenticating and encrypting packets over the network. SNMP v3 security is an additional layer of security offered with the firmware.

Note – The SNMP v3 security is available to a switch that has a secure connection, and can only be configured on the entry switch.

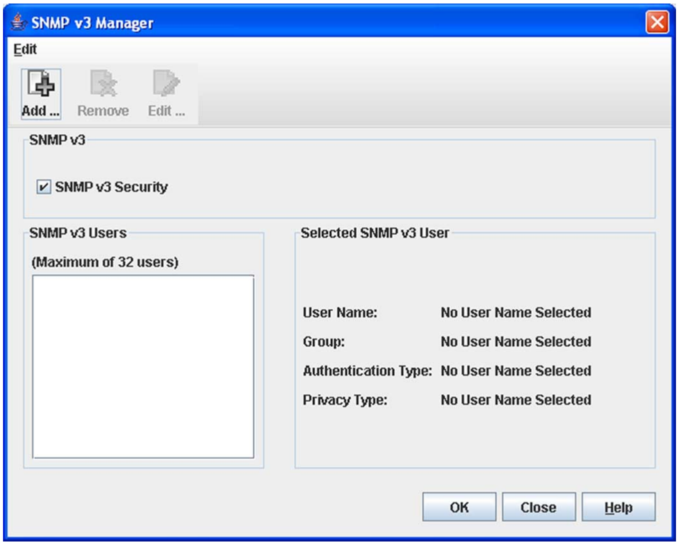
The security features provided in SNMPv3 are:

- Message integrity — ensuring that a packet has not been tampered with during transit.
- Authentication — determining the message is from a valid source.
- Encryption — scrambling the contents of a packet to prevent it from being seen by an unauthorized source.

The SNMP v3 Manager dialog allows you to add, remove, and edit an SNMP v3 user. To display the SNMP v3 Manager dialog (FIGURE 5-20) open the Switch menu, select SNMP, and select SNMP v3 Manager. The SNMP v3 Security option allows you to turn SNMP v3 security on or off.

Click the Add button to open the SNMP v3 User Editor dialog (FIGURE 5-21), and add an SNMP v3 user. After SNMP v3 users are configured and saved, they are displayed in the SNMPv3 Users list window in the SNMP v3 Manager dialog. Select a user from the list, and that user’s settings are displayed on the right in the Selected SNMPv3 User area. The Remove and Edit buttons become active when you select a user from the SNMP v3 Users list. Click the Remove button to delete the selected user. Click the Edit button to open the SNMP v3 User Editor Edit User dialog in which to change the selected user's configuration.

FIGURE 5-20 SNMP v3 Manager Dialog



☑ SNMP v3 Security

SNMP v3 Users

(Maximum of 32 users)

Selected SNMP v3 User

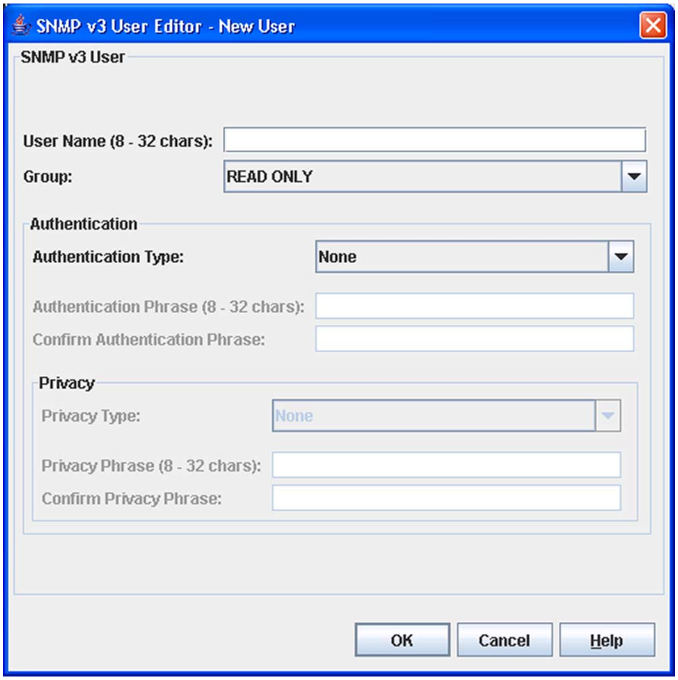
User Name: No User Name Selected

Group: No User Name Selected

Authentication Type: No User Name Selected

Privacy Type: No User Name Selected

FIGURE 5-21 SNMP v3 User Editor Dialog



SNMP v3 User Editor - New User

SNMP v3 User

User Name (8 - 32 chars):

Group: READ ONLY

Authentication

Authentication Type: None

Authentication Phrase (8 - 32 chars):

Confirm Authentication Phrase:

Privacy

Privacy Type: None

Privacy Phrase (8 - 32 chars):

Confirm Privacy Phrase:

TABLE 5-13 describes the SNMP v3 User Editor dialog parameters. After configuring the user, click the OK button to save the settings and close the dialog.

TABLE 5-13 SNMP v3 User Editor Dialog

Parameter	Description
User Name	Name for this SNMP v3 user.
Group	Read Only permits user to view only SNMP v3 user settings. Read Write permits user to view and change SNMP v3 user settings.
Authentication Type	None, MD5, SHA. If None, no authentication phrase is required. MD5 and SHA require authentication phrase.
Authentication Phrase	A unique string or phrase to serve as an password-like authentication phrase.
Confirm Authentication Phrase	Re-enter the same unique string or phrase to serve as an password-like authentication phrase.
Privacy Type	DES or None. If None, no privacy phrase is required.
Privacy Phrase	A unique string or phrase to serve as an password-like privacy phrase.
Confirm Privacy Phrase	Re-enter the unique string or phrase to serve as an password-like privacy phrase.

Downloading a Support File

The Download Support File menu option assembles all log files and switch memory data into an archive file (dump_support.tgz) that can be sent to technical support personnel for troubleshooting switch problems. The Download Support File menu option is not accessible (displayed) for switches that don't support the download support file function. To create a support file, do the following:

1. On the faceplate display, open the Switch menu, and select Download Support File.

2. In the Download Support File dialog, click the Browse button to define a location for the support file or type the path in the text field.

3. Click the Start button to begin the process of creating and downloading the support file to your workstation. Observe the status in the Status area.

4. After the support file is saved to your workstation, click the Close button to close the Download Support File dialog.

Installing Feature License Keys

A feature license key is a password that you can purchase from your switch distributor or authorized reseller to upgrade your switch. License keys vary according to the features you purchase. The feature license keys available are:

- **SANdoctor license key** — provides for testing and tracing FC connections consists of utilizing the FC Ping and FC TraceRoute dialogs to time and track frames from specified targets and destinations.
- **Port Activation license key** — allows you to activate the additional ports you purchase. Switch configurations available for purchase include 8, 12, 16, 20, and 24 ports.
- **20-Gbit/sec license key** — enables the XPAK ports to transmit and receive at 25.5-Gbit/sec instead of the default 12.75-Gbit/sec.

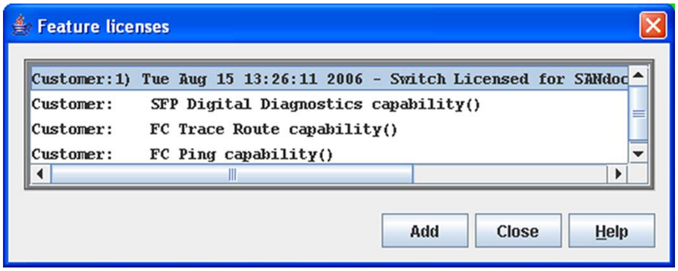
To install a license key and upgrade the switch, do the following:

1. Open the faceplate display for the switch you want to upgrade.

2. Open the Switch Menu and select Features.

3. In the Feature Licenses dialog (FIGURE 5-22), click the Add button.

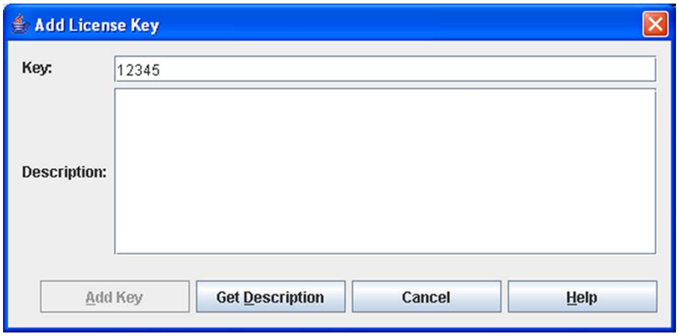
FIGURE 5-22 Features License Key Dialog



```
Customer:1) Tue Aug 15 13:26:11 2006 - Switch Licensed for SANdoc
Customer:    SFP Digital Diagnostics capability()
Customer:    FC Trace Route capability()
Customer:    FC Ping capability()
```

4. In the Add License Key dialog (FIGURE 5-23), enter the license key in the Key field.

FIGURE 5-23 Add License Key Dialog



Key: 12345

Description:

5. Click the Get Description button. The license key description is retrieved and displayed in the Description area for you to verify that this is the license key you ordered.

6. Click the Add Key button to upgrade the switch. Allow a minute or two for the upgrade to complete.

Installing Firmware

Installing firmware involves loading, unpacking, and activating the firmware image on the switch. Enterprise Fabric Suite 2007 does this in one operation. To provide consistent performance throughout the fabric, ensure that all switches are running the same version of firmware.

During a hotreset operation, fabric services will be unavailable for a short period (30-75 seconds depending on switch model). To ensure that an NDCLA operation is successful, verify that all administrative changes to the fabric (if any) are complete.

Caution – Changes to the fabric may disrupt the NDCLA process.

Common administrative operations that change the fabric include:

- Zoning modifications
- Adding, moving or removing devices attached to the switch fabric. This includes powering up or powering down attached devices.
- Adding, moving or removing ISLs or other connections.

After an NDCLA operation is complete, management connections must be re-initiated:

Note – Enterprise Fabric Suite 2007 may not support all firmware versions. If the version of Enterprise Fabric Suite 2007 was not intended to support the firmware version on the switch, a warning status of “FW/GUI mismatch” is displayed for the switch. A switch with this status will still be manageable, but may preclude some operations from being performed.

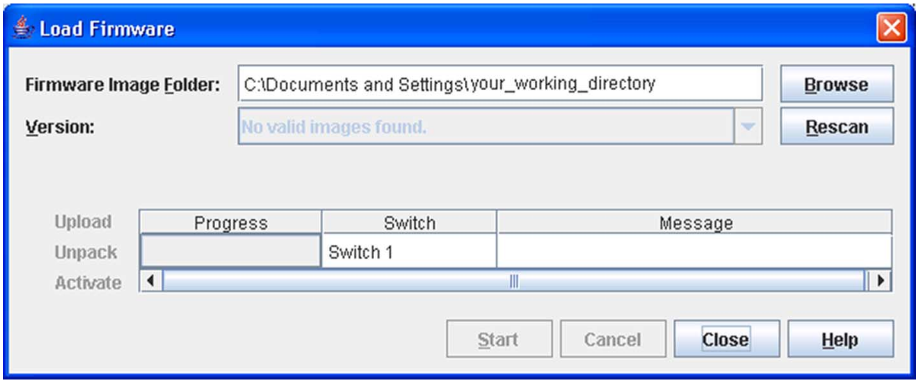
- Enterprise Fabric Suite 2007 sessions will re-connect automatically
- Telnet sessions must be restarted manually.

The applicable code versions are:

- Future switch code releases will be upgraded non-disruptively unless specifically indicated in its associated release notes
- An NDCLA operation to previous switch code releases is not supported.

The Load Firmware dialog (FIGURE 5-24) allows you to select and install a firmware image file. To open the Load Firmware dialog for an individual switch, open the Switch menu and select Load Firmware. When the Load Firmware dialog is opened, the path displayed in the Firmware Image Folder field is automatically searched for firmware image files that can be installed. The default path to search for firmware image files is the user's working directory. To change the path, click the Browse button and select a new path. Click the Rescan button to search the folder displayed in the Firmware Image Folder field. The firmware image files found are listed in and can be selected from the Version drop-down list.

FIGURE 5-24 Load Firmware Dialog



Firmware Image Folder: C:\Documents and Settings\your_working_directory

Version: No valid images found.

Progress	Switch	Message
	Switch 1	

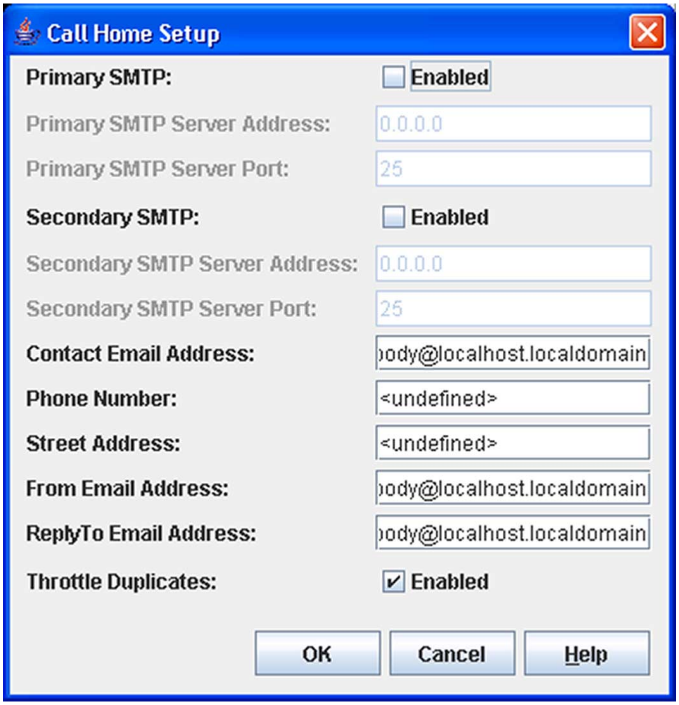
To install firmware, do the following:

1. In the faceplate display, open the Switch menu and select Load Firmware.
2. In the Load Firmware dialog, click the Browse button next to the Firmware Image Folder field to browse for and select the folder containing firmware file to be loaded.
3. Select the firmware file from the Firmware Image Folder.
4. Click the Start button to begin the firmware load process. You will be shown a message indicating the type of reset required in order to activate the firmware.
5. Click the OK button to continue firmware installation.
6. Click the Close button to close the Load Firmware dialog.

Using Call Home

The Call Home feature allows you to configure switches to send alerts regarding events and faults to Email addresses. Examples of Email destinations are pagers, cell phones, NOC (Network Operations Center) operators/applications, and support organizations. You can configure the type of events and where the alerts are sent. Use the Call Home Setup dialog (FIGURE 5-25) to configure call home parameters. To display the Call Home Setup dialog, open the Switch menu, select Call Home, and select Setup.

FIGURE 5-25 Call Home Setup Dialog



Call Home Setup

Primary SMTP: □ Enabled

Primary SMTP Server Address: 0.0.0.0

Primary SMTP Server Port: 25

Secondary SMTP: □ Enabled

Secondary SMTP Server Address: 0.0.0.0

Secondary SMTP Server Port: 25

Contact Email Address:)ody@localhost.localdomain

Phone Number: <undefined>

Street Address: <undefined>

From Email Address:)ody@localhost.localdomain

ReplyTo Email Address:)ody@localhost.localdomain

Throttle Duplicates: ☑ Enabled

TABLE 5-14 lists the entries in the Call Home Setup dialog.

TABLE 5-14 Call Home Setup Entries

Entry	Description
Primary SMTP: (active)	The "(active)" indicates the Primary SMTP (Simple Mail Transfer Protocol) is the SMTP server that CallHome is going to try to use when transmitting Email messages. CallHome operates as an SMTP client, or more correctly, and SMTP sending agent. After any system configuration, the Primary SMTP server will always become the active SMTP, provided it is enabled and has a non-default address defined (0.0.0.0 is the default).
Primary SMTP Server Address:	This is the IP address of the primary (first) SMTP server.
Primary SMTP Server Port:	This is the service port number that the primary SMTP server is listening on to accept connections from SMTP sending agents.

TABLE 5-14 Call Home Setup Entries *(Continued)*

Entry	Description
Secondary SMTP:	The Secondary SMTP is the second SMTP server. If the primary SMTP is not enabled/defined, or if there was a failure in communicating with the primary SMTP server, the Secondary SMTP server will become the (active) SMTP server — the one used by Call Home for the next attempt to transmit Email.
Secondary SMTP Server Address:	The IP address of the secondary (second) SMTP server.
Secondary SMTP Server Port:	The service port number that the secondary SMTP server is listening on to accept connection from SMTP sending agents.
Contact Email Address:	The Email address of the point-of-contact for the switch. This Email address will be included in the text of Email messages using the FullText format under the section for Contact Information.
Phone Number:	The phone number of the point-of-contact for the switch. This value will be included in the text of Email messages using the FullText format under the section for Contact Information.
Street Address:	The address of the point-of-contact for the switch. This value will be included in the text of Email messages using the FullText format under the section for Contact Information.

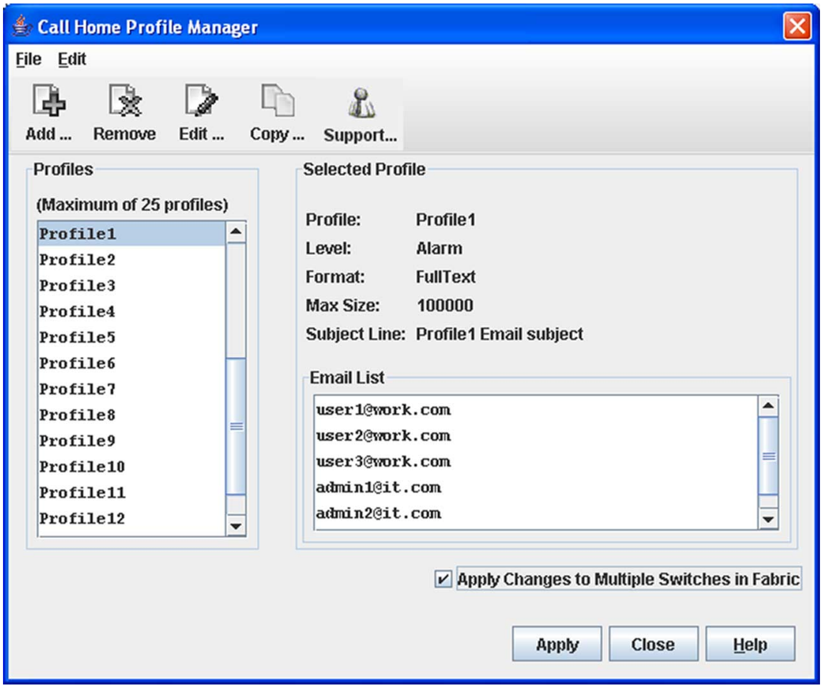
TABLE 5-14 Call Home Setup Entries *(Continued)*

Entry	Description
From Email Address:	The Email address that will be provided to the SMTP server to indicate the sender of the Email being transmitted. In Emails sent by Call Home, this address will appear in the message heading as the "From: " address. This value is required to send Emails. If there are any problems encountered in routing the Email to any of the intended recipients, the notice of the problem will be sent to this address. It is an important address for receiving Email notices concerning problems. This address is also the default address used when replies are sent to an Email by a recipient. If the "Reply-To: " Email address is supplied it will override the sending of replies to the "From: " Email address by recipients. However, any notifications of Email problems sent by any SMTP server used to route the message to the final recipient will always send those notifications to the "From: " address.
ReplyTo Email Address:	The Email address used by mail reading programs to determine the address that an Email should be addressed to for a reply to a received message. This value will override the use of the "From: " address as the recipient for a reply message.
Throttle Duplicates:	This boolean setting indicates if duplicate messages should be suppressed and accumulated. If "True", then after an Email has been transmitted, Call Home will not transmit Email for switch events that would result in duplicate Emails during a specified time window (default is 15 seconds). The time window can be only be configured using the command line interface. During this time window, these duplicate switch events will be accumulated to keep track of how many have occurred. After the time window has expired, an Email message for the event will be transmitted that also includes the count of how many duplicate events were accumulated and the time of the last received event. If additional switch events are received that would result in duplicate Email messages being sent.

Using the Call Home Profile Manager

Use the Call Home Profile Manager dialog (FIGURE 5-26) to manage all profiles on a switch. You can add new profiles, remove profiles, edit profiles, and make copies of existing profiles. To display the Call Home Profile Manager dialog, open the Switch menu, select Call Home, and select Profile Manager. The Profiles list shows all profiles on the switch. The Email List shows all Email addresses associated with the selected profile in the Profiles list. The Apply Changes to Multiple Switches in Fabric option allows you to propagate all profiles on the switch to one or more switches in the fabric. Refer to "Applying All Profiles on a Switch to Other Switches" on page 165 for more information.

FIGURE 5-26 Call Home Profile Manager Dialog



Profiles

(Maximum of 25 profiles)

Profile1
Profile2
Profile3
Profile4
Profile5
Profile6
Profile7
Profile8
Profile9
Profile10
Profile11
Profile12

Selected Profile

Profile:	Profile1
Level:	Alarm
Format:	FullText
Max Size:	100000
Subject Line:	Profile1 Email subject

Email List

user1@work.com
user2@work.com
user3@work.com
admin1@it.com
admin2@it.com

☑ Apply Changes to Multiple Switches in Fabric

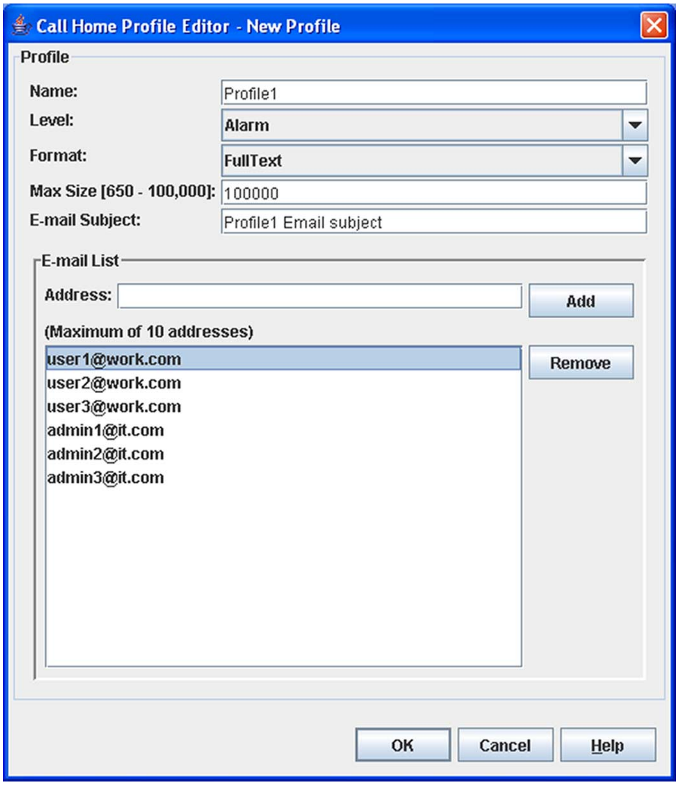
Using the Call Home Profile Editor

Use the Call Home Profile Editor dialog (FIGURE 5-27) when creating a new profile, and editing/copying an existing profile. The Call Home Profile Editor dialog is displayed after clicking the Add, Edit, or Copy buttons on the Call Home Profile Manager dialog. Alternatively, you can open the Edit menu, and select Add New Profile, Edit Profile, or Copy Profile. The name in the title bar changes to reflect adding a new profile, making a copy of an existing profile, or editing an existing profile. Enter a name for the profile, select an event level threshold, a format type for the message text being sent (short/full), enter the size of the message being sent, enter the subject of the Email, and enter the Email address(es) of the recipients. Click the Add button to add the Email address(es) to the list. Click the OK button to save the changes.

You can use the Call Home Profile Editor dialog to make a copy of an existing profile. In the Call Home Profile Manager dialog, select a profile in the list of existing profiles (FIGURE 5-26). To open the Call Home Profile Editor dialog (FIGURE 5-27), click the Copy button or open the Edit menu and select Copy Profile. The dialog is pre-populated with all of the information from the selected profile, except the name. Enter a unique name for the profile copy and click the OK button to save the new profile.

You can use the Call Home Profile Editor dialog to create a new Tech Support profile and edit an existing Tech Support profile. Refer to "Using the Call Home Profile Editor - Tech Support Center Profile Dialog" on page 163 for more information.

FIGURE 5-27 Call Home Profile Editor Dialog



Call Home Profile Editor - New Profile

Profile

Name: Profile1

Level: Alarm

Format: FullText

Max Size [650 - 100,000]: 100000

E-mail Subject: Profile1 Email subject

E-mail List

Address:

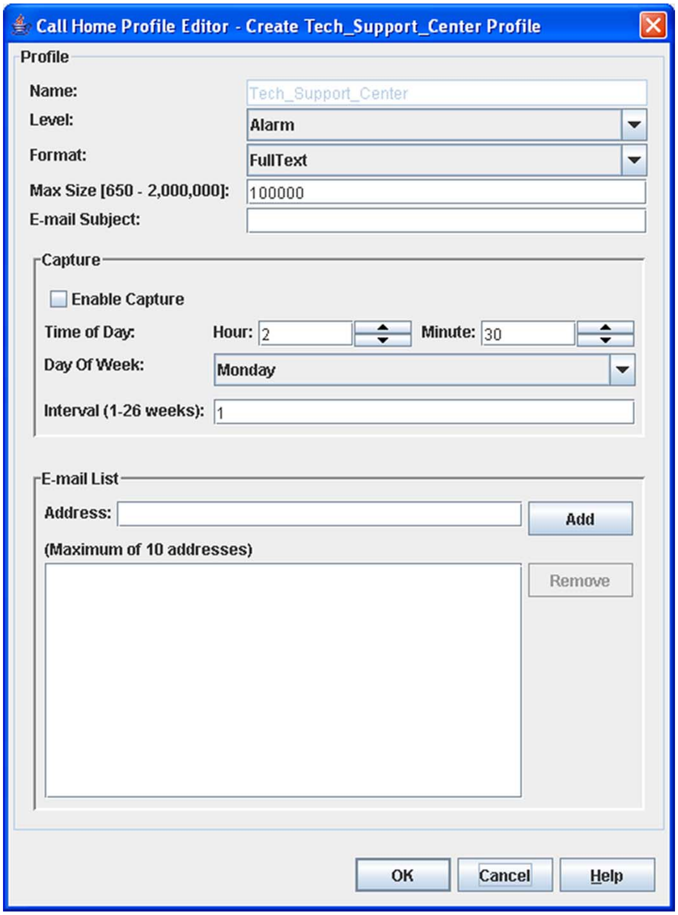
(Maximum of 10 addresses)

user1@work.com
user2@work.com
user3@work.com
admin1@it.com
admin2@it.com
admin3@it.com

Using the Call Home Profile Editor - Tech Support Center Profile Dialog

You can use the Call Home Profile Editor - Tech Support Center Profile dialog to create, edit, or remove a Tech Support Center profile. You can open the Call Home Profile Editor - Tech Support Center Profile dialog two ways: click the Support button on the tool bar in the Call Home Profile Manager dialog, or open the Edit menu and select Create Tech Support Center Profile. The name in the title bar changes to reflect the Tech Support profile function (create or edit).

FIGURE 5-28 Call Home Profile Editor - Tech Support Center Profile Dialog



Call Home Profile Editor - Create Tech_Support_Center Profile

Profile

Name: Tech_Support_Center

Level: Alarm

Format: FullText

Max Size [650 - 2,000,000]: 100000

E-mail Subject:

Capture

□ Enable Capture

Time of Day: Hour: 2 Minute: 30

Day Of Week: Monday

Interval (1-26 weeks): 1

E-mail List

Address:

(Maximum of 10 addresses)

TABLE 5-15 lists the entries in the Call Home Editor - Tech Support Center Profile dialog.

TABLE 5-15 Call Home Editor - Tech Support Center Profile Entries

Entry	Description
Name	The name automatically assigned to the profile. This profile can not be changed or deleted, but the settings can be modified.
Level	The severity level of the event (Alarm, Critical, Warning). The level of events processed by the profile to produce Emails that will be sent to the Email addresses listed in the profile.
Format	The format used to compile and Email message in response to an incoming event that is processed by the profile. Allowed formats include ShortText, FullText, and Tsc1. ShortText includes the minimum amount of detail to describe the event and identify the switch sending the message; it is the intended format for reading on mobile electronic devices. FullText includes the same information as ShortText and provides additional information to identify switch location and contact information for switch administrators; it is the intended format for reading via standard Email clients. The Tsc1 format is similar to the ShortText format but is compiled to simplify machine processing of Email messages.
Max Size (650-2,000,000)	The maximum number of bytes allowed for a Email message compiled for the profile. Most Email messages are relatively small, under 2KB. However, Emails that are produced by a capture operation can be as large as 1MB due to the inclusion of file attachments.
E-mail Subject	The subject line in the Email that will be sent. The string that is appended to the CallHome generated string for the Email message subject line.
Enable Capture	Select to enable or disable the capture operations for the profile. Only the Tech Support Center profile is allowed to define and execute capture operations on the switch.
Time of Day	The time of day, in HH:MM format, when the capture operation will be executed on the switch. Only the Tech Support Center profile is allowed to define and execute capture operations on the switch. The default is 02:30.

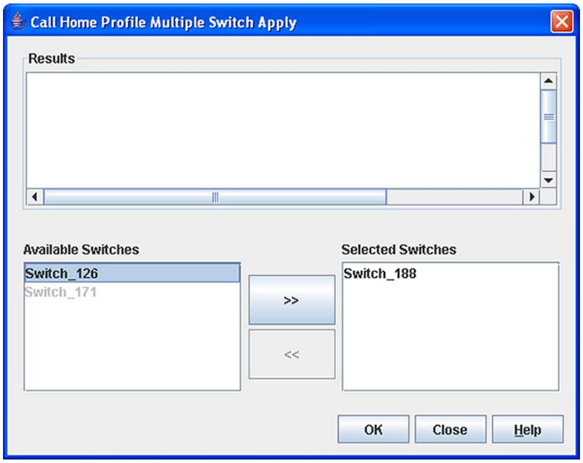
TABLE 5-15 Call Home Editor - Tech Support Center Profile Entries *(Continued)*

Entry	Description
Day of Week	The day of the week, specified as Sunday, Monday, Tuesday, Wednesday, Thursday, Friday or Saturday, when the capture operation will be executed on the switch. The default is Monday.
Interval (1-26 weeks)	The number of weeks that must pass between executions of the capture operation. The default is 1.
Address	The Email address of the recipient being added to the Tech Support Center profile. A maximum of 10 addresses is allowed and displayed in the addresses window.

Applying All Profiles on a Switch to Other Switches

You can apply all profiles on a switch to one or more switches in a fabric. The Call Home Profile Multiple Switch Apply dialog (FIGURE 5-29) is displayed after selecting the Apply Changes to Multiple Switches in Fabric option on the Call Home Profile Manager dialog (FIGURE 5-26). The Available Switches list shows all switches in the fabric. Switch names that are greyed-out do not have current Call Home firmware, and can not receive any profiles. The Selected Switches list shows the switch names that you selected to receive all profiles from the switch. In the Available Switches list, select the switches in the fabric to receive all profiles, and click the double-arrow button to move them to the Selected Switches list. Click the OK button to start the process. The Results area indicates success or failure of applying all the profiles on a switch to the switches you selected.

FIGURE 5-29 Call Home Profile Multiple Switch Apply Dialog



Call Home Profile Multiple Switch Apply

Results

Available Switches

Switch_126
Switch_171

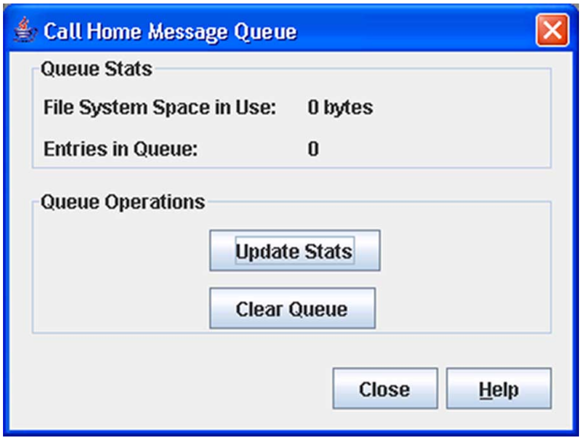
Selected Switches

Switch_188

Using the Call Home Message Queue

Use the Call Home Message Queue dialog (FIGURE 5-30) to access the logged call home statistics. Click the Update Stats button to refresh with the most recent switch Call Home information. Click the Clear Queue button to clear the current statistics.

FIGURE 5-30 Call Home Message Queue Dialog



Call Home Message Queue

Queue Stats

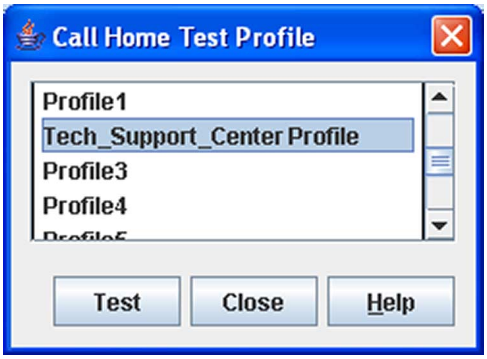
File System Space in Use: 0 bytes

Entries in Queue: 0

Testing Call Home Profiles

Use the Call Home Test Profile dialog (FIGURE 5-31) to test the Call Home parameters currently configured. Select a profile in the window, and click the Test button. To display the Call Home Test Profile dialog, open the Switch menu, select Call Home, and select Test Profile.

FIGURE 5-31 Call Home Profile Manager Dialog



Call Home Test Profile

Profile1

Tech_Support_Center Profile

Profile3

Profile4

Change Over

Changes the inactive SMTP server to become the active SMTP server. To make the inactive SMTP become the active SMTP, open the Switch menu, select Call Home, and select Change Over. Click the OK button to confirm the change over.

CHAPTER 6

Managing Ports

This section describes the following tasks that manage ports and devices:

- Displaying Port Information
- Configuring Ports
- Testing Ports
- Graphing Port Performance

Displaying Port Information

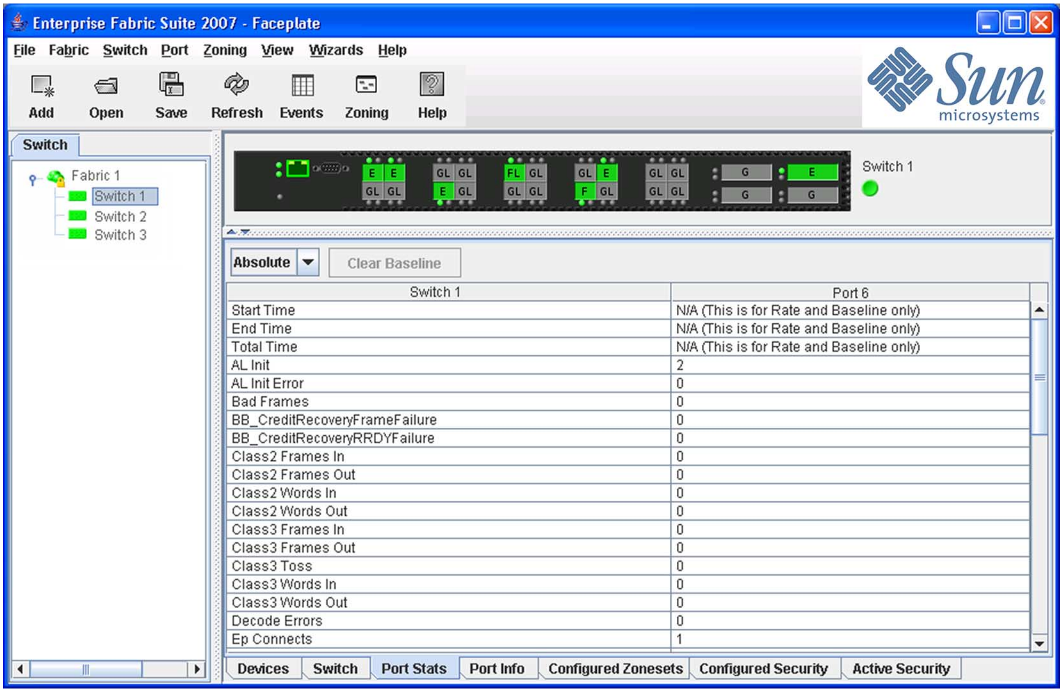
Port information is available primarily in the faceplate display with the Port Statistics data window and the Port Information data window.

Port Statistics Data Window

The Port Statistics data window (FIGURE 6-1) displays port performance data for the selected ports. To open the Port Statistics data window, click the Port Stats tab below the data window in the faceplate display. Refer to TABLE 6-1 for a description of the Port Statistics data window entries.

The Statistics drop-down list is available on the Port Statistics data window, and provides different ways to view detailed port information. Open the drop-down list and select Absolute to view the total count of statistics since the last switch reset. Select Rate to view the number of statistics counted per second over the polling period. Select Baseline to view the total count of statistics since the last time the baseline was set. Click the Clear Baseline button to set the current baseline.

FIGURE 6-1 Faceplate Display — Port Statistics


Enterprise Fabric Suite 2007 - Faceplate
File Fabric Switch Port Zoning View Wizards Help
Add Open Save Refresh Events Zoning Help
Sun microsystems
Switch
Fabric 1
Switch 1
Switch 2
Switch 3
E E GL GL GL GL E GL FL GL GL GL GL E F GL GL GL GL GL G E G G
Switch 1
Absolute
Clear Baseline
Devices Switch Port Stats Port Info Configured Zonesets Configured Security Active Security

Switch 1	Port 6
Start Time	N/A (This is for Rate and Baseline only)
End Time	N/A (This is for Rate and Baseline only)
Total Time	N/A (This is for Rate and Baseline only)
AL Init	2
AL Init Error	0
Bad Frames	0
BB_CreditRecoveryFrameFailure	0
BB_CreditRecoveryRRDYFailure	0
Class2 Frames In	0
Class2 Frames Out	0
Class2 Words In	0
Class2 Words Out	0
Class3 Frames In	0
Class3 Frames Out	0
Class3 Toss	0
Class3 Words In	0
Class3 Words Out	0
Decode Errors	0
Ep Connects	1

TABLE 6-1 describes the Port Statistics data window entries.

TABLE 6-1 Port Statistics Data Window Entries

Entry	Description
Start Time	The beginning of the period over which the statistics apply. The start time for the Absolute view is not applicable. The start time for the Rate view is the beginning of polling interval. The start time for the Baseline view is the last time the baseline was set.
End Time	The last time the statistics were updated on the display.
Total Time	Total time period from start time to end time.
AL Init	Number of times the port entered the initialization state.
AL Init Error	Number of times the port entered initialization and the initialization failed. Increments count when port has a sync loss.
Bad Frames	Number of frames that were truncated due to a loss of sync or the frame didn't end with an EOF.
BB_CreditRecoveryFrameFailure	Number of times more when frames were lost during a credit recovery period than the recovery process could resolve. This causes a Link Reset to recover the credits.

TABLE 6-1 Port Statistics Data Window Entries *(Continued)*

Entry	Description
BB_CreditRecoveryRRDYFailure	Number of times more when R_RDYs were lost during a credit recovery period than the recovery process could resolve. This causes a Link Reset to recover the credits.
Class 2 Frames In	Number of class 2 frames received by this port.
Class 2 Frames Out	Number of class 2 frames transmitted by this port.
Class 2 Words In	Number of class 2 words received by this port.
Class 2 Words Out	Number of class 2 words transmitted by this port.
Class 3 Frames In	Number of class 3 frames received by this port.
Class 3 Frames Out	Number of class 3 frames transmitted by this port.
Class 3 Toss	Number of class 3 frames that were discarded by this port. A frame can be discarded because of detection of a missing frame (based on SEQ_CNT), detection of an E_D_TOV timeout, receiving a reject frame, or receiving a frame on an offline port.
Class 3 Words In	Number of class 3 words received by this port.
Class 3 Words Out	Number of class 3 words transmitted by this port.
Decode Errors	Number of invalid transmission words detected during decoding. Decoding is from the 10-bit characters and special K characters.
Ep Connects	Number of E_Port logins.
FBusy	Number of class 2 and class 3 fabric busy (F_BSY) frames generated by this port in response to incoming frames. This usually indicates a busy condition on the fabric or N_port that is preventing delivery of this frame.
Flow Errors	Number of times a frame is received and all the switch ports receive buffers are full. The normal Fabric Login exchange of flow control credit should prevent this from occurring. The frame will be discarded.
FReject	Number of frames, from devices, that have been rejected. Frames can be rejected for any of a large number of reasons.
Invalid CRC	Number of invalid Cyclic Redundancy Check (CRC) frames detected.
Invalid Destination Address	Number of address identifier (S_ID, D_ID) errors. AL_PA equals non-zero AL_PA found on F_Port.
Link Failures	Number of optical link failures detected by this port. A link failure is a loss of synchronization or by loss of signal while not in the offline state. A loss of signal causes the switch to attempt to re-establish the link. If the link is not re-established, a link failure is counted. A link reset is performed after a link failure.
LIP (AL_PD,AL_PS)	Number of F7, AL_PS LIPs, or AL_PD (vendor specific) resets, performed.

TABLE 6-1 Port Statistics Data Window Entries *(Continued)*

Entry	Description
LIP_F8_F7	This LIP is a loop initialization primitive frame used to indicate that a Loop Failure has been detected at its receiver and does not have a valid AL_PA
LIP(F7,AL_PS)	This LIP is a loop initialization primitive frame used to reinitialize the loop. An L_port, identified by AL_PS, may have noticed a performance degradation and is trying to restore the loop.
LIP(F7,F7)	A loop initialization primitive frame used to acquire an AL_PA.
LIP(F8,AL_PS)	This LIP denotes a loop failure detected by the L_port identified by AL_PS.
Login	Number of device logins that have occurred on the switch.
Logout	Number of device logouts that have occurred on the switch.
LongFrameCount	Number of incidents when one or more frames are received that are greater than the maximum size (2136 bytes).
Loop Timeouts	Number of loop timeouts.
Loss Of Sync	Number of synchronization losses (>100 ms) detected by this port. A loss of synchronization is detected by receipt of an invalid transmission word.
Primitive Sequence Errors	Number of bad primitives received by the port.
Rx Link Resets	Number of link reset primitives received from an attached device.
Rx Offline Sequences	Number of offline sequence primitives received by the port.
ShortFrameCount	Number of incidents when one or more frames are received that are less than the minimum size (24 bytes).
Total Errors	Total number of primitive and non-primitive port link errors.
Total Link Resets	Number of link-reset primitives transmitted by the port.
Total LIPs Received	Number of loop initialization primitive frames received.
Total LIPs Transmitted	Number of loop initialization primitive frames transmitted.
Tx Offline Sequences	Number of offline primitives transmitted by the port.
Total Rx Frames	Total number of frames received by the port.
Total Rx Words	Total number of words received by the port.
Total Tx Frames	Total number of frames transmitted by the port.
Total Tx Words	Total number of words transmitted by the port.
Tx Link Resets	Number of link reset primitives sent from this port to an attached port.

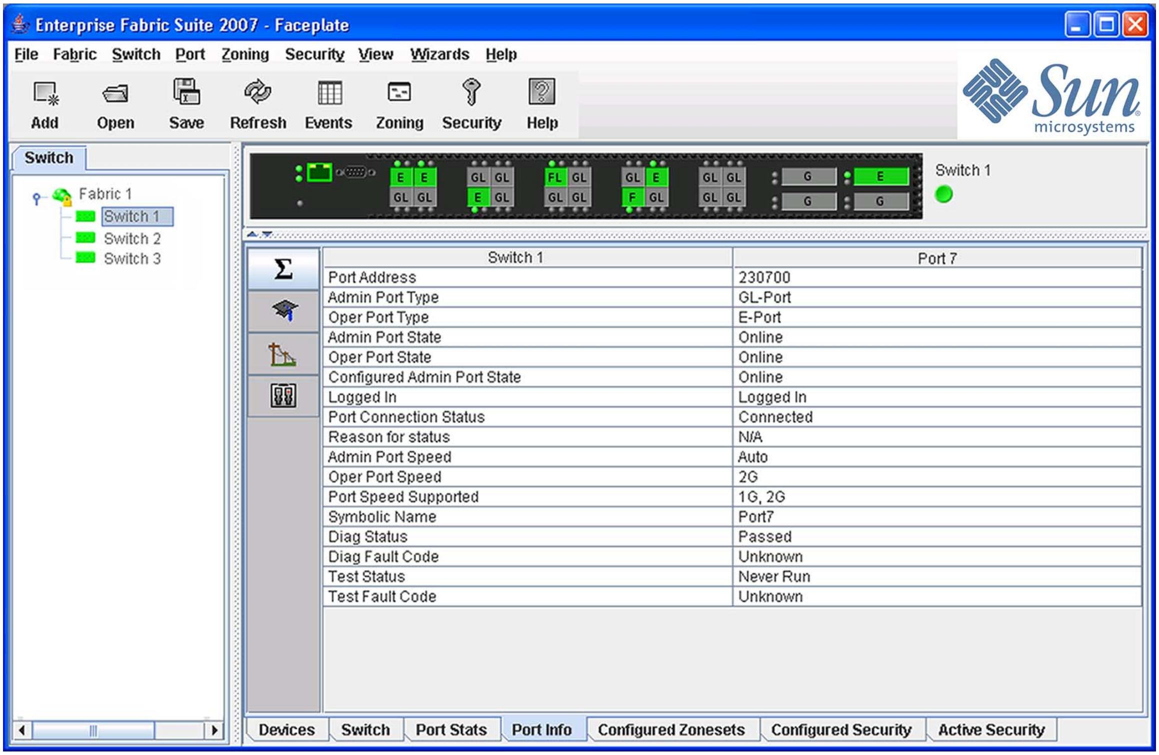
TABLE 6-1 Port Statistics Data Window Entries *(Continued)*

Entry	Description
TotalTXErrors	Total number of errors transmitted by the port.
TotalRXErrors	Total number of errors received by the port.
Total Offline Sequences	Total number of offline sequences transmitted and received by the port.

Port Information Data Window

The Port Information data window (FIGURE 6-2) displays port detail information for the selected ports. To open the Port Information data window, click the Port Info tab below the data window in the faceplate display. Refer to TABLE 6-2 for a description of the Port Information data window entries.

FIGURE 6-2 Faceplate Display — Port Information



Switch 1	Port 7
Port Address	230700
Admin Port Type	GL-Port
Oper Port Type	E-Port
Admin Port State	Online
Oper Port State	Online
Configured Admin Port State	Online
Logged In	Logged In
Port Connection Status	Connected
Reason for status	N/A
Admin Port Speed	Auto
Oper Port Speed	2G
Port Speed Supported	1G, 2G
Symbolic Name	Port7
Diag Status	Passed
Diag Fault Code	Unknown
Test Status	Never Run
Test Fault Code	Unknown

Information in the Port Information data window is grouped and viewed by the Summary, Advanced, Extended Credits, Media, and DDM (Digital Diagnostics Monitoring) buttons. Click a button to display the corresponding information in the data window on the right. FIGURE 6-3 describes the Port Information data window buttons.

FIGURE 6-3 Port Information Data Window Buttons

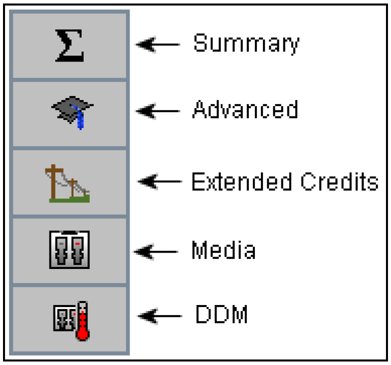


TABLE 6-2 describes the Port Information data window entries.

TABLE 6-2 Port Information Data Window Entries

Entry	Description
Summary Group	
Port Address	Port Fibre Channel address.
Administrative Port Type	The administrative port type (G, GL, F, FL, or Donor). This value is persistent; it will be maintained during a switch reset. During port auto-configuration, it will be used to determine which operational port states are allowed.
Operational Port Type	The port type that is currently active. This will be set during port auto-configuration based on the administrative port type.
Administrative Port State	The port state (Online, Offline, Diagnostics, or Down) which has been set by the user. This state may be different from the configured administrative state if the user has not saved it in the switch configuration. This state is used at the time it is set to try to set the port operational state. This value is not persistent and will be lost on a switch reset.
Operational Port State	The port state that is currently active. This value may be different from the administrative port state, for example due to an error condition.
Configured Administrative Port State	The port state (Online, Offline, Diagnostics, or Down) which is saved in the switch configuration, either by the user or at the factory. This value is persistent; it will be maintained during a switch reset, and will be used after a reset to set the port operational state.

TABLE 6-2 Port Information Data Window Entries *(Continued)*

Entry	Description
Logged In	Indicates whether logged in or not.
Port Connection Status	E_Port connection status. Status can be None, Connecting, Connected or Isolated.
Port Isolation Reason	Why E_Port is isolated.
Administrative Port Speed	The speed requested by the user.
Operational Port Speed	The speed actually being used by the port.
Port Speed Supported	The speeds supported by the port (1-Gbps, 2-Gbps, 4-Gbps, 8-Gbps, 10-Gbps, 20-Gbps)
Symbolic Name	Port symbolic name
POST Status	Status from the most recent Power On Self Test
POST Fault Code	Fault code from the most recent Power On Self Test
Test Status	Status from the most recent port test
Test Fault Code	Fault code from the most recent port test
Advanced Group	
MFS Mode	Multiple Frame Sequence bundling status.
Configured I/O Stream Guard	The requested RSCN message suppression status by the user. Status can be enabled, disabled, or automatically determined by the switch.
Operational I/O Stream Guard	The actual RSCN message suppression status. Status can be enabled, disabled, or automatically determined by the switch.
Device Scan	Device scan status. Enabled means the switch queries the connected device during login for FC-4 descriptor information.
Auto Performance Tuning	Enables the switch to dynamically control the MFS_Enable, VI_Enable and LCF_Enable features based on the operational state of the port.
AL Fairness	Controls how frequently the switch can arbitrate for access. Applies only to ports running in loop (FL) mode.
Port Binding	Ties a specific device WWN to a physical port number.
Upstream ISL	The ISL over which the switch sends requests intended for the principal switch
Downstream ISL	The ISL over which the switch has received requests intended for the principal switch
Extended Credits Group	
Extended Credits Requested	Number of requested credits
Max Credits Available	The maximum number of credits granted to a port that can be used when extending port credits.

TABLE 6-2 Port Information Data Window Entries *(Continued)*

Entry	Description
Credits to Donate	The number of credits available to be donated by the selected port.
Donor Group	The donor group of the selected port.
Valid Donor Groups	The number of separate groups within which extended credits may be donated and assigned.
Media Group	
Media Type	The transceiver fibre type, such as single mode, multi-mode, copper.
Media Speed	The maximum transceiver speed
Media	The transceiver type. The 10-Gbps ports always display "unknown", if attached.
Media Transmitter	The transceiver transmitter type, such as longwave, shortwave, electrical.
Media Distance	The maximum transceiver transmission distance
Media Vendor	The company that manufactured the SFP
Media Vendor ID	The IEEE registered company ID
Media Part Number	The part number assigned to the SFP
Media Revision	Transceiver hardware version
DDM Group	
Details	For ports with media that support DDM, a button will be available that displays a dialog with detailed information for the media in the port.
Temperature (C)	The measured temperature for the media in the port.
Voltage (V)	Internally measured supply voltage. The measured supply voltage for the media in the port.
Tx Bias (mA)	Measured transmitter laser bias current. The measured transmitter, laser bias current for the media in the port.
Tx Power (mW)	Measured transmitter laser output power. The measured Tx output power for the media in the port.
Rx Power (mW)	Measured received optical power. The measured Rx optical power for the media in the port

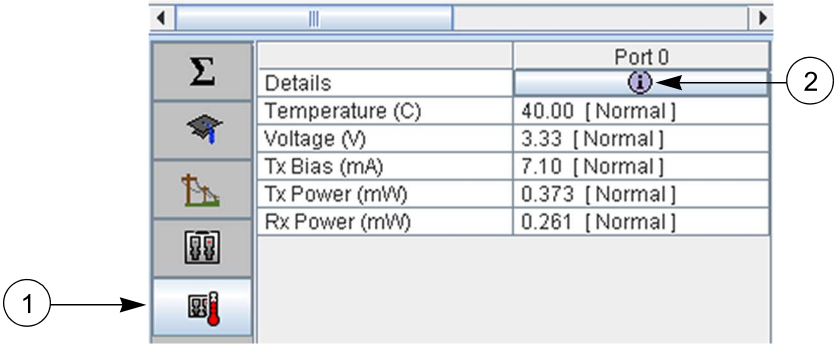
Digital Diagnostics Monitoring

Digital Diagnostics Monitoring (DDM) maintains values for temperature, voltage, txbias, txpower and rxpower. In the display, the value is followed by the status. The status values are Normal, LowAlarm, LowWarning, HighAlarm and HighWarning (media vendor-supplied threshold values that are read from the media device). Low warning and high warning threshold values indicate the normal guaranteed range of operation. Exceeding either low warning or high warning should not be a cause for link failure. Exceeding either low alarm or high alarm would most likely cause a link failure.

Note – The SANdoctor license key is required to enable this feature.

Click the DDM button in Port Information data window to display the DDM entries. Refer to TABLE 6-2 for descriptions of DDM entries.

FIGURE 6-4 DDM Entries and Information Button



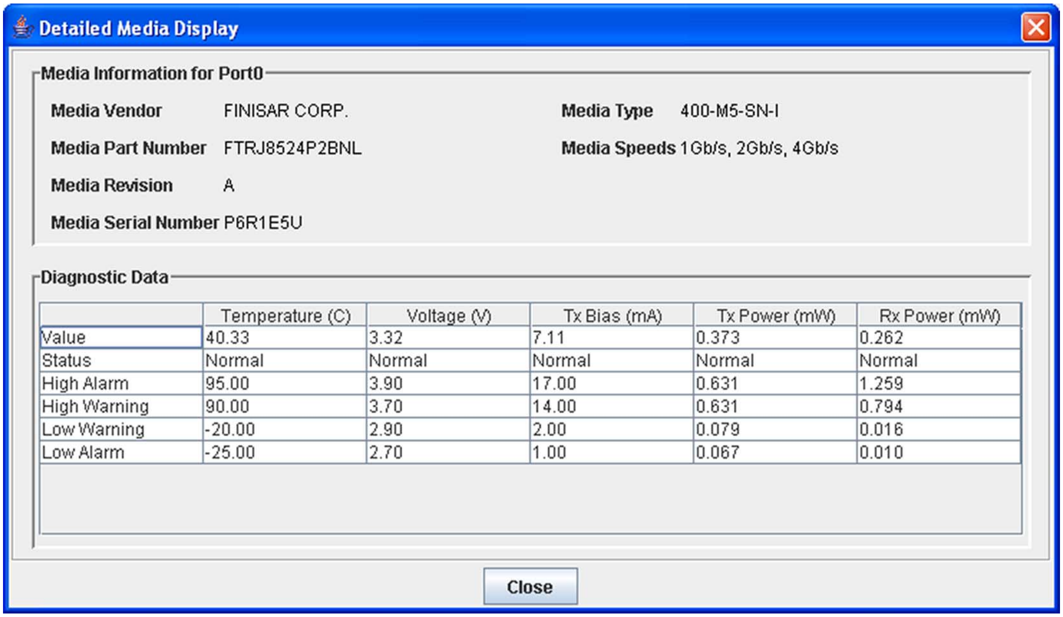
	Port 0
Details	ⓘ
Temperature (C)	40.00 [Normal]
Voltage (V)	3.33 [Normal]
Tx Bias (mA)	7.10 [Normal]
Tx Power (mW)	0.373 [Normal]
Rx Power (mW)	0.261 [Normal]

Figure Legend

1	DDM Button	**2**	Information Button

Click the (i) button at the top of the column (FIGURE 6-4) for each port that supports DDM to open the Detailed Media Display dialog for the port.

FIGURE 6-5 Detailed Media Display Dialog



Media Information for Port0

Media Vendor FINISAR CORP.

Media Part Number FTRJ8524P2BNL

Media Revision A

Media Serial Number P6R1E5U

Media Type 400-M5-SN-I

Media Speeds 1Gb/s, 2Gb/s, 4Gb/s

Diagnostic Data

	Temperature (C)	Voltage (V)	Tx Bias (mA)	Tx Power (mW)	Rx Power (mW)
Value	40.33	3.32	7.11	0.373	0.262
Status	Normal	Normal	Normal	Normal	Normal
High Alarm	95.00	3.90	17.00	0.631	1.259
High Warning	90.00	3.70	14.00	0.631	0.794
Low Warning	-20.00	2.90	2.00	0.079	0.016
Low Alarm	-25.00	2.70	1.00	0.067	0.010

The Detailed Media Display dialog (FIGURE 6-5) is opened after you click the **(i)** button at the top of the Port column. The data displayed is a snapshot of the values of that particular media at the time the dialog is displayed. The dialog displays a more detailed look at the media inserted into a specific port. The values are read-only; they serve as a snapshot for that time and do not change.

The media information will be polled, and changes in data values, changes in status, new media being inserted, media being unplugged should be reflected in the data on display in the table.

The upper half of the dialog contains information about the media plugged into the port: Vendor, Part Number, Revision, Serial Number, Type, and Speeds Supported. The lower half of the dialog contains a table of diagnostic data specific to the media plugged into the port. For each of the 5 values (Temperature, Voltage, Tx Bias, Tx Power, and Rx Power), the current value, status, high alarm, high warning, low warning, and low alarm values will be displayed. The default for each of the fields is “N/A” until the data is read.

Monitoring Port Status

Use the faceplate display to perform the following port monitoring tasks:

- Displaying Port Types
- Displaying Port Operational States
- Displaying Port Speeds
- Displaying Transceiver Media Status

To display port number and status information for a port, position the cursor over a port on the faceplate display. The status information changes depending on the View menu option selected.

Displaying Port Types

To display port type status, from the faceplate display, open the View menu, and select View Port Types. TABLE 6-3 lists the possible port types and their meanings.

TABLE 6-3 Port Types

Type	Description
F_Port	Fabric port — supports a single public device (N_Port).
FL_Port	Fabric loop port — self discovers a single device (N_Port) or a loop of up to 126 public devices (NL_Port).
G_Port	Generic port — self discovers as an F_Port or an E_Port.
GL_Port	Generic loop port — self discovers as an F_Port, FL_Port, or an E_Port. GL_Port is the default port type. A single device on a public loop will attempt to configure as an F_Port first, then if that fails, as an FL_Port.
Donor	Donor port — allows buffer credits to be used by another port.

Displaying Port Operational States

To display the operational state on each port in the faceplate display, open the View menu and select View Port States. TABLE 6-4 lists the possible operational states and their meanings. The port operational state refers to actual port state and not the administrative state you may have assigned.

TABLE 6-4 Port Operational States

Symbol	Description
🟩	**Online** — port is active and ready to send data.
None	**Inactive** — port operational state is offline, but administrative state is online.
🟥	**Isolated** — E_Port has lost its connection. Refer to "Port Information Data Window" on page 173 for information about why the E_Port has isolated.
🚫	**Offline** — port is active, can receive signal, but cannot accept a device login.
🔧	**Diagnostics** — port is in diagnostics mode in preparation for testing
❌	**Downed** — the port is disabled, power is removed from the lasers, and can't be logged in.

Displaying Port Speeds

To display the speed of each port in the faceplate display, open the View menu and select View Port Speeds. TABLE 6-5 lists the possible port speeds.

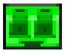
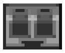
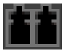
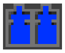
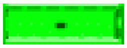
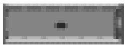
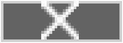
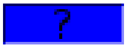
TABLE 6-5 Port Speeds

Speed	Description
1G	1-Gbps transmission speed
2G	2-Gbps transmission speed
4G	4-Gbps transmission speed
8G	8-Gbps transmission speed
10G	10-Gbps transmission speed
20G	20-Gbps transmission speed

Displaying Transceiver Media Status

To display transceiver media status, open the View menu and select View Port Media. TABLE 6-6 lists the port media states and their meanings.

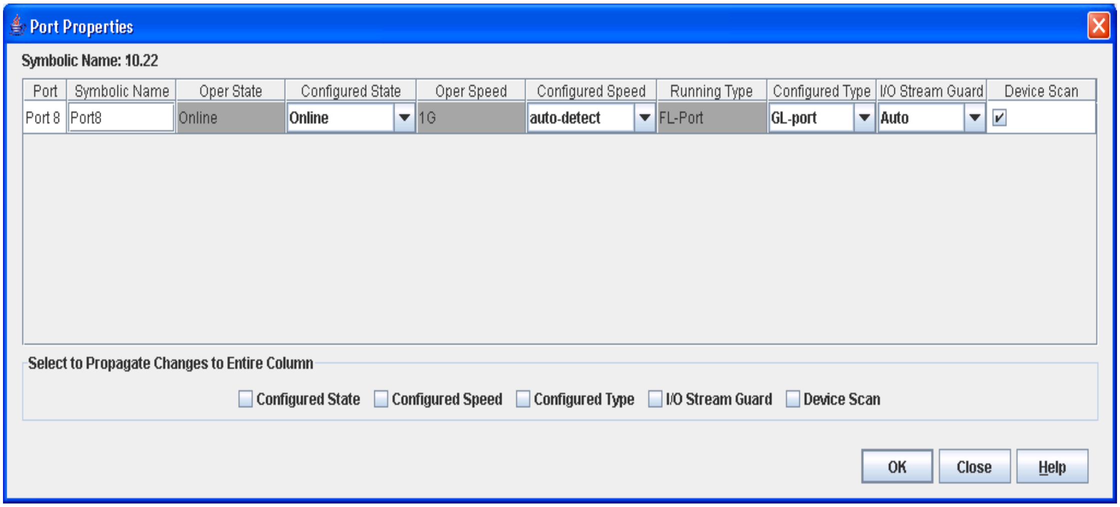
TABLE 6-6 Transceiver Media View

Media Icon	Description
	Optical SFP, online (green/black), logged-in, active, and ready to send data.
	Optical SFP, offline (gray/black), not logged-in, active, can receive signal, but cannot accept a device login
	Optical SFP, unlicensed (dark gray/black)
	Optical SFP, unknown, unlicensed (dark gray/blue)
	XPAK online (green/black), logged-in, active, and ready to send data
	XPAK offline (gray/black), not logged-in, active, can receive signal, but cannot accept a device login
	XPAK, unlicensed (dark gray/white)
	XPAK, unknown (blue/black)
None	Empty port; no transceiver installed (gray) or unlicensed (dark gray)

Configuring Ports

The port settings or characteristics are configured using the Port Properties dialog (FIGURE 6-6). To open the Port Properties dialog, select one or more ports, open the Port menu, and select Port Properties.

FIGURE 6-6 Port Properties Dialog



Symbolic Name: 10.22

Port	Symbolic Name	Oper State	Configured State	Oper Speed	Configured Speed	Running Type	Configured Type	I/O Stream Guard	Device Scan
Port 8	Port8	Online	Online	1G	auto-detect	FL-Port	GL-port	Auto	☑

Select to Propagate Changes to Entire Column

□ Configured State □ Configured Speed □ Configured Type □ I/O Stream Guard □ Device Scan

The Port Properties dialog displays the switch name and the selected ports. Use the Port Properties dialog to configure port parameters.

Note – Use the Select to Propagate Changes to Entire Column options to propagate the same change to all selected ports, select the check box before making a change to a port.

- Changing Port Symbolic Name
- Changing Port Administrative States
- Changing Port Speeds
- Changing Port Types
- I/O Stream Guard
- Device Scan

Changing Port Symbolic Name

To change the symbolic name of a port from the faceplate display, do the following:

1. Open the faceplate display and select a port.
2. Open the Port menu and select Port Properties to open the Port Properties dialog.
3. Click inside the Symbolic Name field, and enter a new name for the port.
4. Click the OK button.

Changing Port Administrative States

The port administrative state determines the operational state of a port. The port administrative state exists in two forms: the configured administrative state and the current administrative state.

- Configured administrative state — the state that is saved in the switch configuration and is preserved across switch resets.
  Enterprise Fabric Suite 2007 always makes changes to the configured administrative state.
- Current administrative state — the state that is applied to the port for temporary purposes and is not preserved across switch resets. The current administrative state is set using the Set Port command. Refer to the *Sun Storage Fibre Channel Switch 5802 Command Line Interface Guide* for more information.

TABLE 6-7 describes the port administrative states. To change port administrative state, do the following:

1. Select one or more ports in the faceplate display.
2. Open the Port menu and select Port Properties to open the Port Properties dialog.
3. Select the Port States option that corresponds to the port state you want.
4. Click the OK button to write the new port state to the switch.

TABLE 6-7 Port Administrative States

State	Description
Online	Activates and prepares port to send data.
Offline	Prevents port from receiving signal and accepting a device login.
Diagnostics	Prepares port for testing and prevents the port from accepting a device login.
Downed	Disables the port.

Changing Port Speeds

SFP ports are capable of transmitting and receiving at 1-Gbit/sec, 2-Gbit/sec, 4-Gbit/sec, or 8-Gbit/sec. XPAK ports are capable of transmitting and receiving at 10-Gbit/sec or 20-Gbit/sec. All ports can be configured for either a fixed transmission speed or to sense (auto-detect) the transmission speed of the device to which it is connected.

Note – 8-Gbit/sec SFPs do not support 1-Gbit/sec speed. You should not set the port speed to 1-Gbit/sec if an 8-Gbit/sec SFP is inserted, as the port will be downed if you do.

To change the port speed, do the following:

1. Select one or more ports in the faceplate display.
2. Open the Port menu and select Port Properties.
3. Select the option that corresponds to the port speed you want.
4. Click the OK button to write the new port speed to the switch.

TABLE 6-8 describes the port speeds.

TABLE 6-8 Port Speeds

Speed	Description
1G	1-Gbps transmission speed
2G	2-Gbps transmission speed
4G	4-Gbps transmission speed
8G	8-Gbps transmission speed
10G	10-Gbps transmission speed
20G	20-Gbps transmission speed

Changing Port Types

The ports can be configured to self-discover the proper type to match the device or switch to which it is connected. TABLE 6-9 describes the port types. To change the port type, do the following:

1. Select one or more ports in the faceplate display.
2. Open the Port menu and select Port Properties to open the Port Properties dialog.
3. Select the Port Type option for the port type you want.

4. Click the OK button to write the new port type to the switch.

TABLE 6-9 Port Types

State	Description
F_Port	**Fabric port** — supports a single public device (N_Port).
FL_Port	**Fabric loop port** — self discovers a single device (N_Port) or a loop of up to 126 public devices (NL_Port).
G_Port	**Generic port** — self discovers as an F_Port or an E_Port.
GL_Port	**Generic loop port** — self discovers as an F_Port, FL_Port, or an E_Port. GL_Port is the default port type. A single device on a public loop will attempt to configure as an F_Port first, then if that fails, as an FL_Port.
Donor	**Donor port** — allows buffer credits to be used by another port.

I/O Stream Guard

The I/O Stream Guard feature suppresses the Registered State Change Notification (RSCN) messages on a port basis. I/O Stream Guard should be enabled only on ports connected to initiator devices. To configure the I/O Stream Guard option using the Port Properties dialog, open the Port menu, and select Port Properties. Select the option that corresponds to one of the following options:

- **Enable** — suppresses the reception of RSCN messages from other ports for which I/O Stream Guard is enabled.
- **Disable** — allows free transmission and reception of RSCN messages.
- **Auto** — suppresses the reception of RSCN messages when the port is connected to an initiator device with a QLogic® HBA. The default is Auto.

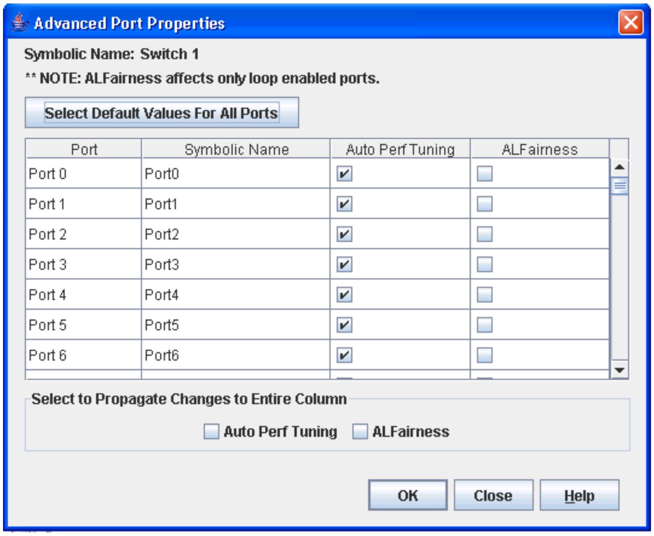
Device Scan

The Device Scan feature queries the connected device during login for FC-4 descriptor information. Disable this parameter only if the scan creates a conflict with the connected device.

Auto Performance Tuning and AL Fairness

The Auto Perf Tuning and AL Fairness settings are configured using the Advanced Port Properties dialog (FIGURE 6-7). The Auto Perf Tuning option enables the switch to dynamically control the MFS_Enable, VI_Enable and LCF_Enable features based on the operational state of the port. The AL Fairness option controls how frequently the switch can arbitrate for access. Applies only to ports running in loop (FL) mode. To open the Advanced Port Properties dialog, select one or more ports, open the Port menu, and select Advanced Port Properties.

FIGURE 6-7 Advanced Port Properties Dialog



Symbolic Name: Switch 1

** NOTE: ALFairness affects only loop enabled ports.

Port	Symbolic Name	Auto Perf Tuning	ALFairness
Port 0	Port0	☑	□
Port 1	Port1	☑	□
Port 2	Port2	☑	□
Port 3	Port3	☑	□
Port 4	Port4	☑	□
Port 5	Port5	☑	□
Port 6	Port6	☑	□

Select to Propagate Changes to Entire Column

□ Auto Perf Tuning □ ALFairness

Using the Extended Credits Wizard

The Extended Credit Wizard is a series of dialogs that leads you through the process of extending credits based on transmission distance requirements. Warning dialogs are provided to help you avoid un-intentional changes. Each port is supported by a data buffer with a 16-credit capacity; that is, 16 maximum sized frames.

For fibre optic cables, this enables full bandwidth over the following approximate distances:

- 26 kilometers at 1-Gbit/sec (0.6 credits/Km)
- 13 kilometers at 2-Gbit/sec (1.2 credits/Km)
- 6 kilometers at 4-Gbit/sec (2.4 credits/km)
- 3 kilometers at 8-Gbit/sec (4.8 credits/km)

Beyond these distances, there is some loss of efficiency because the transmitting port must wait for an acknowledgement before sending the next frame.

Longer distances can be spanned at full bandwidth on ports by extending credits to G_Ports, F_Ports, and E_Ports. Each port can donate 15 credits to a pool from which a recipient port can borrow. The recipient port also loses a credit in the process. For example, you can configure a recipient port to borrow 15 credits from one donor port for a total of 30 credits (15+15=30). This will support communication over the following approximate distances:

- 50 Km at 1-Gbit/sec (30÷0.6)
- 25 Km at 2-Gbit/sec (30÷1.2)
- 12 Km at 4-Gbit/sec (30÷2.4)
- 6 Km at 8-Gbit/sec (30÷4.8)

Note – You can utilize unused donor ports with the Extended Credit Wizard only when pointing to a switch running firmware that supports this feature.

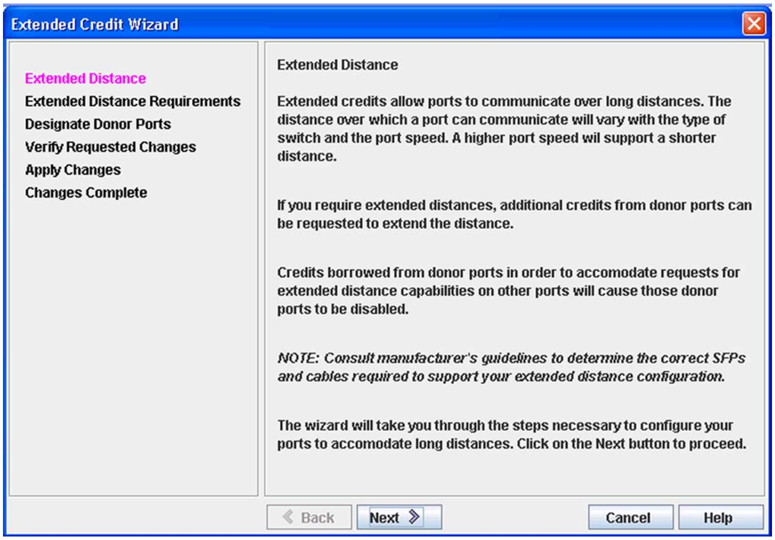
To extend credits, open the Wizards menu and select Extended Credit Wizard. The Extended Credit Wizard leads you through the following process to extend credits based on transmission distance requirements:

1. Extended Distance — explains the concepts and principles of extending port credits. Click the Next button.

2. Extended Distance Requirements — specify speed and distance requirements for each port then click the Next button.

3. Designate Donor Ports — select available ports and click >> to move the port into the Selected Donor Port column (FIGURE 6-8). Match the number of ports needed with the number of designated donor ports. Click the Next button.

FIGURE 6-8 Designate Donor Ports



Extended Credit Wizard

- Extended Distance
- Extended Distance Requirements
- Designate Donor Ports
- Verify Requested Changes
- Apply Changes
- Changes Complete

Extended Distance

Extended credits allow ports to communicate over long distances. The distance over which a port can communicate will vary with the type of switch and the port speed. A higher port speed wil support a shorter distance.

If you require extended distances, additional credits from donor ports can be requested to extend the distance.

Credits borrowed from donor ports in order to accomodate requests for extended distance capabilities on other ports will cause those donor ports to be disabled.

NOTE: Consult manufacturer's guidelines to determine the correct SFPs and cables required to support your extended distance configuration.

The wizard will take you through the steps necessary to configure your ports to accomodate long distances. Click on the Next button to proceed.

4. Verify Requested Changes: Review the extended distance requests and the selected donor ports. Click the Finish button to apply the changes, and redistribute the credits.

Note – As credits are used, the Logged-In LEDs on the corresponding donor ports illuminate continuously. In addition, donor port Activity LEDs will reflect the same traffic as the recipient port. Donor ports whose credits are being used are unavailable to devices that are connected to them.

Resetting a Port

The Reset Port option reinitializes the port using the saved configuration. To reset a port, do the following:

1. Select one or more ports in the faceplate display.

2. Open the Port menu and select Reset Port.

3. In the Reset Port dialog, click the Yes button.

Moving a Licensed Port

The Move Port option opens the Move Port dialog which allows you to move a currently licensed port to another port of the same type that is currently unlicensed.

To move a licensed port, do the following:

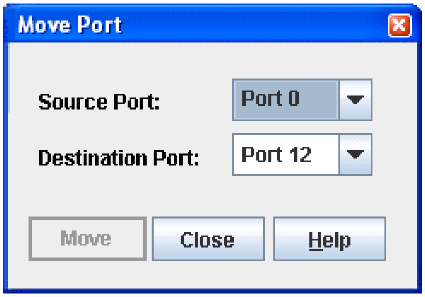
1. Open the Port menu and select Move Port to open the Move Port dialog (FIGURE 6-9).

2. Select the source port from the Source Port drop-down list.

3. Select the destination port from the Destination Port drop-down list. The Destination Port pull-down list is filtered by the port type chosen in the Source Port pull-down menu. That is, the list of destination ports is either internal or external, depending on the source port type selected.

4. Click the Move button to switch the licensed port.

FIGURE 6-9 Move Port Dialog



Source Port: Port 0

Destination Port: Port 12

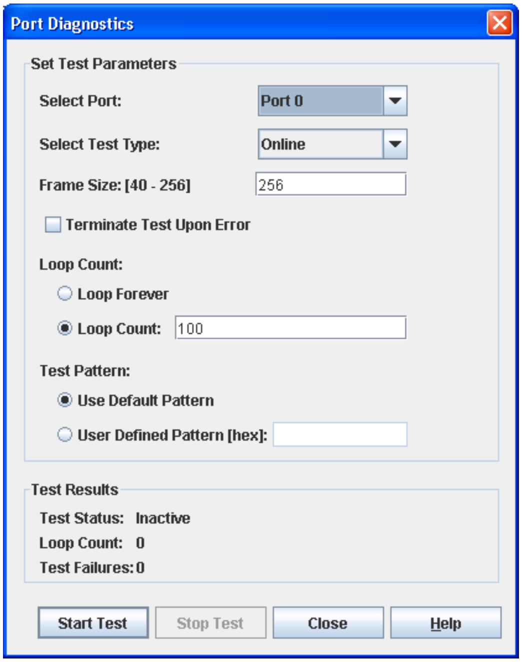
Testing Ports

You can test a port using the Port Diagnostics dialog. Only one port can be tested at a time for each type of test. The Port Diagnostics dialog (FIGURE 6-10) presents the following tests:

- **Online** — a non-disruptive test that verifies communications between the port and its device node or device loop. The port being tested must be online and connected to a remote device, and therefore, does not disrupt communication. The port passes the test if the frame that was sent by the ASIC matches the frame that was received.

- **Internal** — a disruptive test that verifies port circuitry. The SerDes level test sends a test frame from the ASIC through the SerDes chip and back to the ASIC for the selected ports. The port passes the test if the frame that was sent by the ASIC matches the test frame that was received. This test requires that the port be in diagnostics mode.
- **External** — a disruptive test that verifies port circuitry. The SFP level test sends a test frame from the ASIC through the SerDes chip, through the SFP transceiver fitted with an external loopback plug, and back to the ASIC for the selected ports. The port passes the test if the test frame that was sent by the ASIC matches the test frame that was received. This test requires that the port be in diagnostics mode.

FIGURE 6-10 Port Diagnostics Dialog



Port Diagnostics

Set Test Parameters

Select Port: Port 0

Select Test Type: Online

Frame Size: [40 - 256] 256

□ Terminate Test Upon Error

Loop Count:

○ Loop Forever

● Loop Count: 100

Test Pattern:

● Use Default Pattern

○ User Defined Pattern [hex]:

Test Results

Test Status: Inactive

Loop Count: 0

Test Failures: 0

To test a port, do the following:

1. In the faceplate display, select a port, open the Port menu and select Port Diagnostics.

2. Choose one of the following:

   - Select Online Port Diagnostics to open the Port Diagnostics dialog. Select the port to test in the Select Port drop-down list. The test type is Online by default.

- Select Other Port Diagnostics to open the Port Diagnostics dialog (this option will disrupt traffic). Select the port number and Internal or External test type in the drop-down list.

3. Enter a frame size (default is 256).

4. Enable or disable the Terminate Test Upon Error option.

5. Select a Loop Count option. The Loop Forever option runs the test until you click the Stop Test button. The Loop Count option runs the test a specific number of times.

6. Select a Test Pattern option. Accept the default test pattern, or select the User Defined option and enter a value.

7. Click the Start Test button to begin the test. Observe the results in the Test Results area.

Note – If the Test Status field in the Test Results area indicates Failed, note the Test Fault Code displayed in the Port Information data window and contact Tech Support.

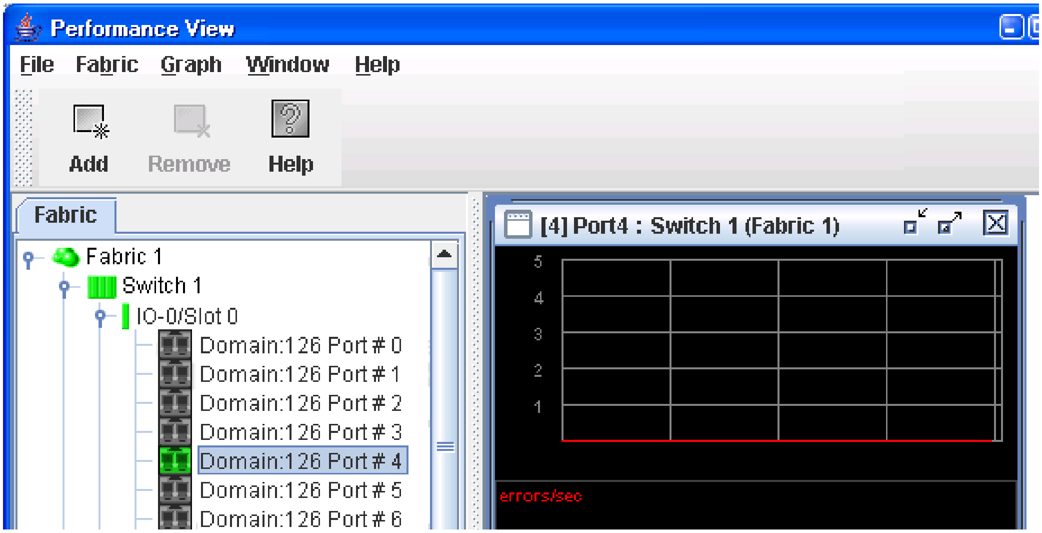
Graphing Port Performance

Performance View application displays port performance using graphs. Performance View plots data communication rates and total errors for selected ports (FIGURE 6-11). When graphing data communication rates, you can choose frames/second or KBytes/second. The maximum number of open graphs is 64.

On Solaris OS platforms, if you launch the Performance View application from the Enterprise Fabric Suite 2007 application and Performance View can not connect to the fabric, (for example, if you have reached the maximum number of Enterprise Fabric Suite 2007 sessions on the entry switch), then Performance View opens with a blue fabric icon displayed in the fabric tree.

Fabric status is displayed in text format after the fabric name in the fabric tree. The color of the icon indicates the current connection status as normal (green), warning (yellow), critical (red), or unmanageable (blue).

FIGURE 6-11 Fabric View Graphs



This section describes how to do the following:

- Starting Performance View
- Exiting Performance View
- Saving and Opening Performance View Files
- Changing the Default Performance View File Encryption Key
- Setting Performance View Preferences
- Setting the Polling Frequency
- Displaying Graphs
- Saving Graph Statistics to a File

Starting Performance View

To start Performance View from within Enterprise Fabric Suite 2007, open the topology display, select a fabric icon in the fabric tree, and then select Start Performance View from the Fabric menu. When starting the Performance View application from the Enterprise Fabric Suite 2007 application, the fabric currently displayed in the Enterprise Fabric Suite 2007 topology display opens automatically in the Performance View topology display.

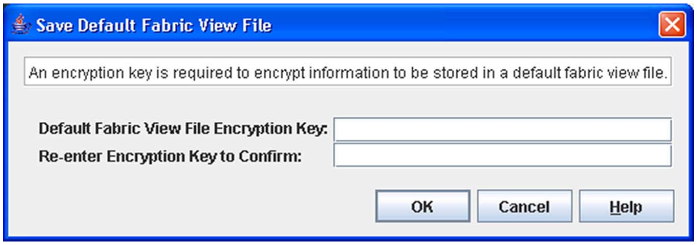
Exiting Performance View

To exit a Performance View session, open the File menu and select Exit. The current fabric view is automatically saved to your Default Performance View File upon exit, if you have defined an encryption key. The key is encrypted and saved with your Default Performance View File. A Performance View file contains the set of fabrics that have been added and the graphs that have been opened during a Performance View session. If you have not yet defined an encryption key, the Save Default Performance View File dialog (FIGURE 6-12) prompts you to save the current view file as the default performance view file. Refer to "Changing the Default Performance View File Encryption Key" on page 194 for information about defining and changing this encryption key.

In the Save Default Performance File dialog, enter an encryption key in the Default File Encryption Key field. Re-enter the encryption key in the Re-enter Encryption Key to Confirm field. Click the OK button to save the current set of fabrics to the Default Performance View File in the working directory.

To prevent Performance View from prompting you to save the Default Performance View File between sessions, set the Auto Load and Save Graphing Environment setting to Enable (default). Refer to "Setting Performance View Preferences" on page 195 for more information.

FIGURE 6-12 Save Default Performance View File Dialog


Save Default Fabric View File

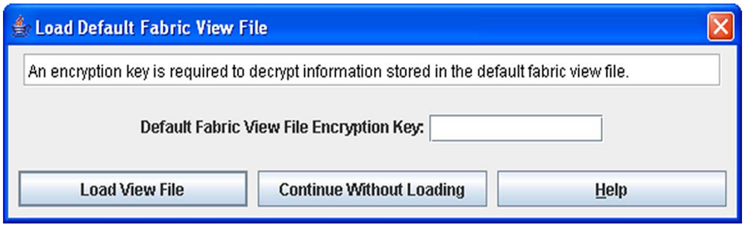
An encryption key is required to encrypt information to be stored in a default fabric view file.

Default Fabric View File Encryption Key:

Re-enter Encryption Key to Confirm:

In your next Performance View session, the Load Default View File dialog (FIGURE 6-13) prompts you to load the Default Performance View File and to specify its encryption key, if there is one. In the Default File Encryption Key field, enter the encryption key and click the Load View File button. If you do not want to load the Default Performance View File, click the Continue Without Loading button to open the Performance View with no fabric displayed.

FIGURE 6-13 Load Default Performance File Dialog



An encryption key is required to decrypt information stored in the default fabric view file.

Default Fabric View File Encryption Key:

Saving and Opening Performance View Files

In addition to the Default Performance View File, you can save and open your own Performance View files. A Performance View file contains the set of fabrics, graphs, and graphing options. To save a Performance View file, do the following:

1. Open the File menu and select Save View As to open the Save View dialog.
2. Enter a name for the Performance View file or click the Browse button to select an existing file. Files are saved in the working directory.
3. Enter a password. When you attempt to open this Performance View file, you will be prompted for this password. If you leave the File Password field blank, no password is required.
4. Click the OK button.

To open a Performance View file, do the following:

1. Open the File menu and select Open View File to open the Open View dialog.
2. Enter a name for the Performance View file or click the Browse button to select an existing file.
3. Click the OK button.

Changing the Default Performance View File Encryption Key

To change the encryption key for the Default Performance View File, do the following:

1. Open the File menu and select Save Default Fabric View File to open the Save Default Performance View File dialog.
2. Enter the new encryption key in the Default File Encryption Key field.

3. Re-enter the same encryption key in the Re-enter Encryption Key to Confirm field.

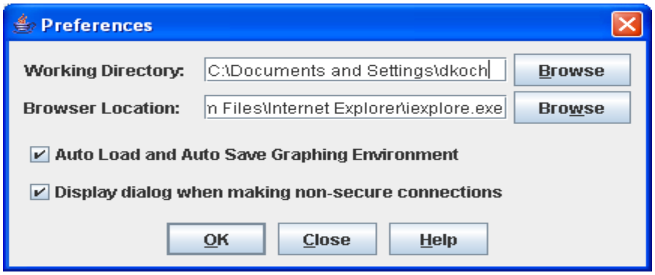
4. Click the OK button to save the changes.

Setting Performance View Preferences

To set Performance View preferences, open the File menu and select Preferences to open the Preferences dialog (FIGURE 6-14). Set the following preferences and click the **OK** button to save the changes:

- Change the location of the working directory in which to save files
- Change the location of the browser used to view the online help.
- Enable or disable the Auto Load and Auto Save Graphing Environment option. When enabled, Performance View prompts you to save and load the default fabric file between sessions. Refer to "Exiting Performance View" on page 193 for more information on the default performance view file.
- Enable or disable the Display Dialog When Making Non-Secure Connections option. If enabled, the Non-Secure Connection Check dialog is displayed when you attempt to open a non-secure fabric. You then have the option of opening a non-secure fabric. If disabled, you cannot open a fabric with a non-secure connection.

FIGURE 6-14 Preferences – Performance View



Preferences

Working Directory: C:\Documents and Settings\dkoch

Browser Location: n Files\Internet Explorer\iexplore.exe

☑ Auto Load and Auto Save Graphing Environment

☑ Display dialog when making non-secure connections

Setting the Polling Frequency

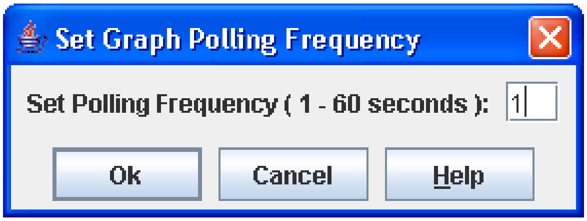
Performance View updates the graphs once per second by default.

Note – System performance decreases as more graphs are opened. To improve system performance, increase the polling frequency (higher number of seconds between polls) and/or tile the graphs (fastest refresh time). Refer to "Arranging Graphs in the Display" on page 197 for information on the arrangement and size of graphs in the display..

To change this polling frequency, do the following:

1. Open the Graph menu, and select Set Polling Frequency to open the Set Graph Polling Frequency dialog.

FIGURE 6-15 Set Graph Polling Frequency Dialog



Set Graph Polling Frequency

Set Polling Frequency (1 - 60 seconds): 1

2. Enter the new polling interval in seconds [1–60]. Performance View will update the graphs once during the interval. For example, setting the polling frequency to 5 seconds will return 1 second's worth of data every 5 seconds.

3. Click the OK button to save the changes.

Displaying Graphs

The maximum number of open graphs is 64 To display graphs, do the following:

1. Open the Fabric menu and select Add Fabric or click the Add button. Enter a fabric name and an IP address in the Add a New Fabric dialog. Include an account name and a password.

2. Set the graphing options and polling frequency. By default, Performance View plots total bytes transmitted and received at a polling frequency of once per second. Refer to "Customizing Graphs" on page 197 for information about changing what is plotted and how it is plotted.

3. You can display graphs in the following ways:
   - Click on a switch entry handle and select one or more ports.
   - Right-click on a switch icon in the fabric tree and select Open Graph for All Logged-In Ports from the drop-down list.

4. You can move graphs around individually by clicking and dragging, or you can arrange them as a group. Refer to "Arranging Graphs in the Display" on page 197 for more information.

To remove a graph, click the graph's X button. To remove all graphs, open the Window menu and select Close All.

To remove a fabric and its graphs, select the fabric in the fabric tree, then select Remove Fabric from the Fabric menu. You can also right-click on a fabric and select Remove Fabric for the popup menu.

Right-clicking on a graph opens a popup menu from which you can change graph options, print a graph, or save the graph statistics to a file.

Arranging Graphs in the Display

To arrange and size graphs in the display, open the Window menu and select Cascade, Tile, or Close All.

Note – System performance decreases as more graphs are opened. To improve system performance, increase the polling frequency (higher number of seconds between polls) and/or tile the graphs (fastest refresh time). Refer to "Setting the Polling Frequency" on page 195 for information on polling frequency.

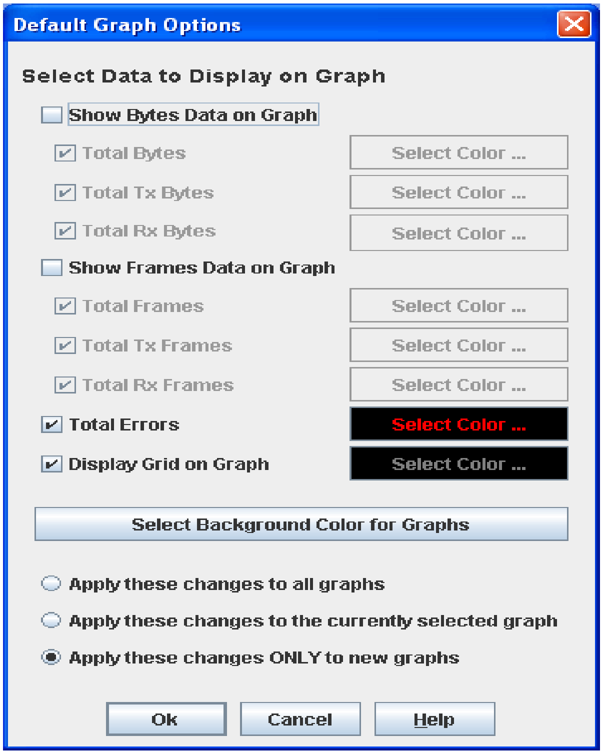
- **Cascade** — overlaps the graphs so that all graphs are at least partially visible.
- **Tile** — arranges the graphs in non-overlapping rows and columns. The Tile option has a faster refresh rate, so system performance improves.
- **Close All** — closes all graphs.

You can also click a graph on the Window menu to bring that graph to the front.

Customizing Graphs

To choose what is to be plotted, open the Graph menu and select Modify Graph Options. You can also right-click on a graph and select Change Graph Options. This opens the Default Graph Options dialog (FIGURE 6-16).

FIGURE 6-16 Default Graph Options Dialog



Default Graph Options

Select Data to Display on Graph

□ Show Bytes Data on Graph

☑ Total Bytes — Select Color ...

☑ Total Tx Bytes — Select Color ...

☑ Total Rx Bytes — Select Color ...

□ Show Frames Data on Graph

☑ Total Frames — Select Color ...

☑ Total Tx Frames — Select Color ...

☑ Total Rx Frames — Select Color ...

☑ Total Errors — Select Color ...

☑ Display Grid on Graph — Select Color ...

Select Background Color for Graphs

○ Apply these changes to all graphs

○ Apply these changes to the currently selected graph

● Apply these changes ONLY to new graphs

To modify the graph options, do the following:

1. Choose the units for the graph:
   - Select the Show Bytes Data on Graph option to plot data in KBytes/second
   - Select the Show Frames Data on Graph option to plot data in frames/second
2. Choose what data type to plot. For example, if you selected Show Frames Data on Graph in step 1., you can plot one or all of the following.
   - Total frames transmitted and received (Total Frames)
   - Total frames transmitted (Total Tx Frames)
   - Total frames received (Total Rx Frames)
3. You can also plot total errors by selecting the Total Errors option.
4. Select the Display Grid on Graph option to display the unit grid.
5. Choose the color scheme for the graph. Click a Select Color button to open its corresponding Select Color dialog, which allows you to select a new color scheme. You can select the color for each data type, the unit grid, and the background by

clicking the corresponding color field or button. In each case, you can choose a color using the Swatches, Red-Green-Blue (RGB), or Hue-Saturation-Brightness (HSB) method.

Note – Clicking the Reset button in the Swatches, HSB, and RGB tab pages of the Select Color dialogs will reset the colors in the Preview area to the last saved color scheme. At this point you are only selecting a new color scheme to be saved.

- **Swatches** — click the Swatches tab. Select a swatch from the palette.
- **HSB** — click the HSB tab. Select a color using any of the following:
  - Click in the color palette.
  - Select the H, S, or B button and use the slide to vary the value.
  - Enter values in the H, S, or B input fields.
- **RGB** — click the RGB tab. Select a color by moving the slides to adjust the values for red, blue, and green; or enter values in the input fields.

6. Select the corresponding option to apply changes to all graphs, the currently selected graph, or only new graphs.

7. Click the OK button to save the color scheme changes and close the dialog.

Setting Global Graph Type

The Set Global Graph Type option allows you to view port activity using two types of graphs:

- Line Graph - plots continuous port activity in horizontal line format.
- Bar Graph - the last polling value received by the application in bar graph format.

To set the global graph type, open the Graph menu, select Global Graph Type, and select Line Bar or Bar Graph.

Rescaling a Selected Graph

The Rescale Selected Graph option auto-scales downward and re-positions the data within a graphic window to better display the data points currently in the graph. To rescale a selected graph, do the following:

1. Select a displayed graph.

2. Open the Graph menu and select Rescale Selected Graph, or right-click on the graph and select Rescale from the popup menu.

Printing Graphs

To print a graph, select a graph, then open the File menu and select Print Graph Window. You can also right-click on a graph and select Print Graph Window from the popup menu.

Saving Graph Statistics to a File

Statistics for one or all graphs can be saved to a file that can be opened with a spreadsheet application. To save a graph statistics file, do the following:

1. Select a graph.
2. Open the File menu, and select Save Current Graph Statistics to a File to save the selected graph or select Save All Graph Statistics to a File. You can also right-click on a graph and select Save Statistics to File.
3. In the Save dialog, enter a path name for the file. By default, the file is saved in the working directory.
4. Click the Save button.

Glossary

Access Control List Zone Access Control List zoning divides the fabric for purposes of controlling discovery and inbound traffic.

Active Zone Set The zone set that defines the current zoning for the fabric.

Active Firmware The firmware image on the switch that is in use.

Activity LED A port LED that indicates when frames are entering or leaving the port.

Administrative State State that determines the operating state of the port or switch. The configured administrative state is stored in the switch configuration. The configured administrative state can be temporarily overridden using the command line interface.

Alarm A message generated by the switch that specifically requests attention. Alarms are generated by several switch processes. Some alarms can be configured.

Alias A named set of ports or devices. An alias is not a zone, and can not have a zone or another alias as a member.

AL_PA Arbitrated Loop Physical Address

Arbitrated Loop A Fibre Channel topology where ports use arbitration to establish a point-to-point circuit.

Arbitrated Loop Physical Address (AL_PA) A unique one-byte value assigned during loop initialization to each NL_Port on a loop.

ASIC Application Specific Integrated Circuit

Auto Save Zoning parameter that determines whether changes to the active zone set that a switch receives from other switches in the fabric will be saved to permanent memory on that switch.

BootP A type of network server.

Buffer Credit A measure of port buffer capacity equal to one frame.

Class 2 Service A service which multiplexes frames at frame boundaries to or from one or more N_Ports wit h acknowledgment provided.

Class 3 Service A service which multiplexes frames at frame boundaries to or from one or more N_Ports without acknowledgment.

Configured Zone Sets The zone sets stored on a switch excluding the active zone set.

Domain ID User defined number that identifies the switch in the fabric.

Enterprise Fabric Suite 2007 Switch management application.

Event Log Log of messages describing events that occur in the fabric.

Expansion Port E_Port that connects to another FC-SW-2 compliant switch.

Fabric Database The set of fabrics that have been opened during an Enterprise Fabric Suite 2007 session.

Fabric Management Switch The switch through which the fabric is managed.

Fabric Name User defined name associated with the file that contains user list data for the fabric.

Fabric Port An F_Port.

Fabric View File A file containing a set of fabrics that were opened and saved during a previous Enterprise Fabric Suite 2007 session.

Flash Memory Memory on the switch that contains the chassis control firmware.

Frame Data unit consisting of a start-of-frame (SOF) delimiter, header, data payload, CRC, and an end-of-frame (EOF) delimiter.

Inactive Firmware The firmware image on the switch that is not in use.

In-band Management The ability to manage a switch through another switch over an inter-switch link.

Initiator The device that initiates a data exchange with a target device.

In-Order-Delivery A feature that requires that frames be received in the same order in which they were sent.

Inter-Switch Link The connection between two switches using E_Ports.

IP Internet Protocol

LIP Loop Initialization Primitive sequence

Maintenance Button Momentary button on the switch used to reset the switch or place the switch in maintenance mode.

Maintenance Mode Maintenance mode sets the IP address to 10.0.0.1 and provides access to the switch for maintenance purposes.

Management Information Base A set of guidelines and definitions for SNMP functions.

Management Workstation PC workstation that manages the fabric through the fabric management switch.

MIB Management Information Base

NDCLA Non-Disruptive Code Load and Activation

NL_Port Node Loop Port. A Fibre Channel device port that supports arbitrated loop protocol.

N_Port Node Port. A Fibre Channel device port in a point-to-point or fabric connection.

Orphan Zone Set Zones that are currently not in a zone set are considered to be part of the orphan zone set. The orphan zone set is not an actual zone set, but rather a way of displaying the zones that are not currently in a zone set.

Pending Firmware The firmware image that will be activated upon the next switch reset.

POST Power On Self Test

Power On Self Test (POST) Diagnostics that the switch chassis performs at start up.

Principal Switch The switch in the fabric that manages domain ID assignments.

SFP Small Form-Factor Pluggable.

Small Form-Factor Pluggable A transceiver device, smaller than a GigaBit Interface Converter, that plugs into the Fibre Channel port.

SNMP Simple Network Management Protocol

Status (OK) LED A chassis LED that indicates the status of the internal switch processor and the results of the Power-On Self-Test.

Target A storage device that responds to an initiator device.

UDP User Datagram Protocol

User Account An object stored on a switch that consists of an account name, password, authority level, and expiration date.

VCCI Voluntary Control Council for Interference

World Wide Name (WWN) A unique 64-bit address assigned to a device by the device manufacturer.

WWN World wide name

XPAK A 10-Gbit/sec transceiver device that plugs into the Fibre Channel port.

Zone A set of ports or devices grouped together to control the exchange of information.

Zone Set A set of zones grouped together. The active zone set defines the zoning for a fabric.

Zoning Database The set of zone sets, zones, and aliases stored on a switch.

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