

# hp StorageWorks

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## ha-fabric manager user guide

Part Number: AA-RS2CB-TE

Second Edition (January 2003)

This guide describes the HP StorageWorks High Availability Fabric Manager (HAFM), its features, and how to use it to monitor, configure, and manage the Fibre Channel in which managed products operate. Fabric zoning, HAFM server administration, and HAFM logs are also covered.



i n v e n t

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## About this Guide

This publication is part of a document suite that supports the Hewlett-Packard (HP) StorageWorks Director 2/64, Director 2/140, Edge Switch 2/16, Edge Switch 2/32, Edge Switch 2/24, and *High Availability Fabric Manager (HAFM)* application.

### Intended Audience

This publication is intended for data center administrators, LAN administrators, operations personnel, and customer support personnel who administer user access to this application and monitor and manage product operation.

### Related Documentation

For a list of corresponding documentation, see the Related Documents section of the Release Notes that came with the product.

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

<http://h18006.www1.hp.com/storage/saninfrastructure.html>

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

## Document Conventions

The conventions included in [Table 1](#) apply.

**Table 1: Document Conventions**

Element	Convention
Cross-reference links	Blue text: <a href="#">Figure 1</a>
Key names, menu items, buttons, and dialog box titles	<b>Bold</b>
File names, application names, and text emphasis	<i>Italics</i>
User input, command names, system responses (output and messages)	Monospace font COMMAND NAMES are uppercase unless they are case sensitive
Variables	<i>Monospace, italic font</i>
Website addresses	Sans serif font ( <a href="http://thenew.hp.com">http://thenew.hp.com</a> )

## Symbols in Text

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



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

---



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

---

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

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

---

## Symbols on Equipment



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

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

---



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

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

---



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

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

---



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

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

---



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

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

---

## Rack Stability



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

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

## Getting Help

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

## HP Technical Support

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

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

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

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)

- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

## HP Website

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

## HP Authorized Reseller

For the name of your nearest HP Authorized Reseller:

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



---

# Introduction and General Information

This chapter presents an overview of the High Availability Fabric Manager (HAFM). It includes:

- An introduction to using HAFM.
- Information on how to access HAFM.

## Introduction to High Availability Fabric Management

The High Availability Fabric Manager (HAFM) is a Java-based graphical user interface (GUI) that enables the user to manage users and products, monitor products, and open Product Managers.

**NOTE:** Although the HAFM and Product Managers are separate applications, the Product Managers are only accessible through the HAFM.

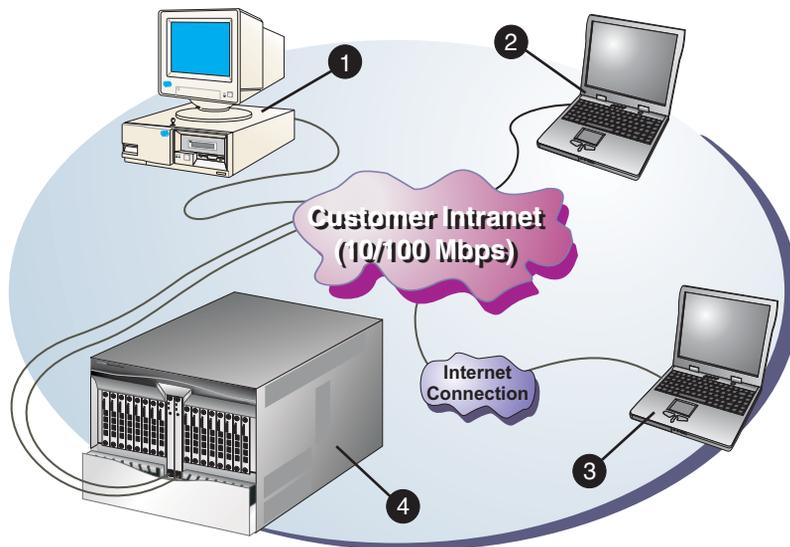
The HAFM and Product Managers are installed on the HAFM server to provide local access to managed products. These applications can also be installed on remote user workstations to provide remote access to the managed products through the HAFM server. A maximum of eight concurrent remote users (in addition to the local HAFM server user) can log in to the *High Availability Fabric Manager* application. For details on configuring remote workstations, refer to the appendix in this guide that covers your workstation operating system.

Besides the HAFM and Product Managers on the HAFM server, out-of-band (non-Fibre Channel) management access to HP products is provided through the following:

- Management using simple network management protocol (SNMP). An SNMP agent is implemented through the *HAFM* application that allows administrators on SNMP management workstations to access product management information using any standard network management tool. Administrators can assign Internet Protocol (IP) addresses and corresponding community names for up to six SNMP workstations functioning as SNMP trap message recipients.

- Management through the Internet using the EWS interface installed on the Director or Switch. This interface supports configuration, statistics monitoring, and basic operation of the product, but does not offer all the capabilities of the corresponding *Product Manager* application. Administrators launch the web server interface from a remote PC by entering the product's IP address as the Internet uniform resource locator (URL), then entering a user name and password at a login screen. The PC browser then becomes a management console.
- Management through a PC-based Telnet session using the command line interface (CLI). Any platform that supports Telnet client software can be used.

Figure 1–1 illustrates an example of out-of-band product management. In the figure, the managed product is a Director 2/64. The “customer intranet” could be as simple as an HP Ethernet hub to connect these devices.



SHR-2314

- |                               |  |
|-------------------------------|--|
| ❶ SNMP management workstation | ❸ Web browser or remote user workstation |
| ❷ HAFM server                 | ❹ Director 2/64                          |

**Figure 1–1: Out-of-Band product management**

## HAFM Server Information

The HAFM server is a personal computer (PC) platform that provides a central point of control for managed Fibre Channel products. The HAFM server is required for installing, configuring, and managing these products.

**NOTE:** Although products can perform normal operations without an HAFM server, the HAFM server should operate at all times to monitor product operations, report failures, log event changes, and log configuration changes.

## High Availability Fabric Manager Overview

This section provides a general overview of the HAFM features.

### Logging in to the High Availability Manager

The HAFM starts automatically when the HAFM server is powered on. If it is necessary to start the application yourself, perform the following steps.

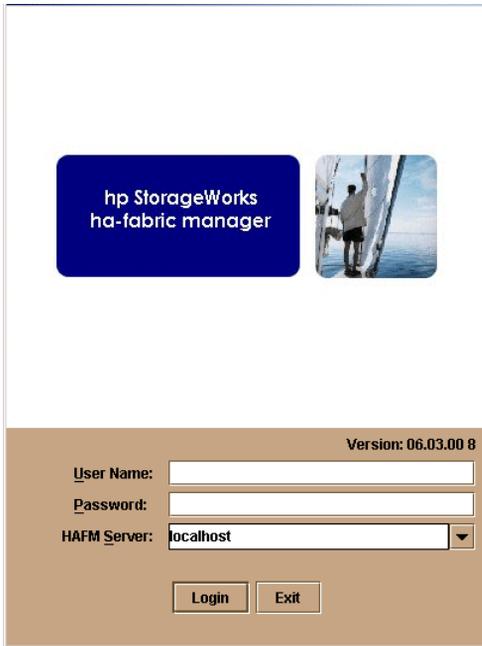
1. Turn on the HAFM server, or if the server is already turned on, double-click the HAFM icon on the desktop.

The *High Availability Fabric Manager* application opens.

2. In the HAFM **Login** dialog box ([Figure 1-2 on page 1-4](#)), enter your user name and password in the **User Name** and **Password** fields. User names and passwords are case-sensitive.

**NOTE:** If user names have not been established, you can use the default user name (Administrator) and password (password). The user name and password are case-sensitive. HP recommends that you change the default password as soon as possible.

To add or modify user names, passwords, and user rights, refer to the appropriate sections under [Users on page 3-8](#).



**Figure 1–2: High Availability Fabric Manager Login dialog box**

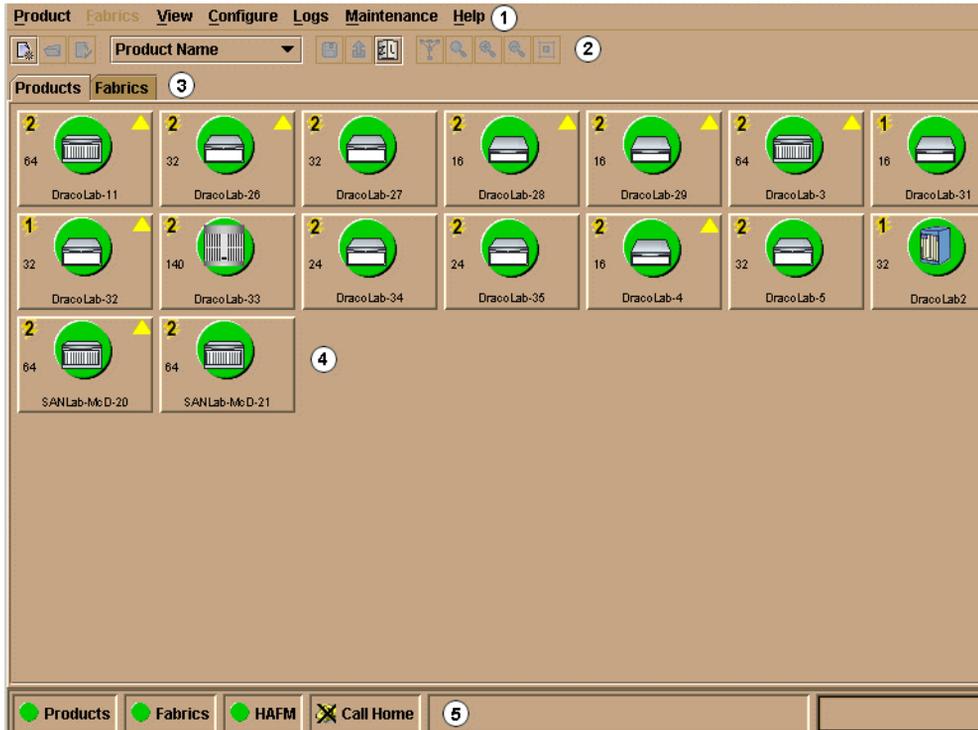
3. In the **HAFM Server** field, type or choose the HAFM server to which you want to connect. If you are logging in to the local HAFM server, the HAFM server name is *localhost*.

The default address that displays in the **HAFM Server** box is the address of the last server accessed. Click the HAFM server arrow to see the network addresses of all HAFM servers that were accessed from the computer you are logged into.

If you want to connect to an HAFM server that is not listed, enter the server name or IP address in the **HAFM server** field.

4. Click **Login**.

The main HAFM window displays the **Product View** (Figure 1–3).



**Figure 1–3: High Availability Fabric Manager main window**

- ❶ Menu Bar. For details, refer to [Chapter 3, Using the Menu Bar](#).
- ❷ Tool Bar. For details, refer to [Tool Bar on page 2-3](#).
- ❸ View Tabs. For details, refer to [Main Panel on page 2-8](#).
- ❹ Main Panel. For details, refer to [Main Panel on page 2-8](#).
- ❺ Status Panel. For details, refer to [Status Bar on page 2-11](#).

## Accessing Remote HAFM Servers

To access remote HAFM servers, enter the server's network address or DNS host name in the HAFM **Login** dialog box. If you are already logged in to the HAFM and want to access this dialog box, choose **Logout** from the **Product** menu.



**Figure 1–4: High Availability Fabric Manager Login dialog box**

1. In the HAFM **Login** dialog box, enter your user name and password.

**NOTE:** If user names have not been established, you can use the default user name (Administrator) and password (password). The user name and password are case-sensitive. We recommend that you change the default password as soon as possible.

2. Delete the existing host name or IP address in the HAFM Server field, and enter or choose a valid HAFM server IP address or host name.
3. Click **Login**.

If the HAFM window displays, you have logged in to the server. The server network address you entered will remain in the HAFM server list for future logins. If you fail to connect to the HAFM server, the network address will not remain in the list.

## Managing Remote Access to the HAFM Server

Users at the HAFM server can open the HAFM and Product Managers loaded on the server itself. Users at remote PC workstations can also access the same HAFM server or other HAFM servers if the workstations meet minimum hardware and software requirements and are running the *HAFM* application. Workstations must also be configured to connect with the HAFM server over a TCP/IP network connection.

[Figure 1–1 on page 1-2](#) illustrates a remote user workstation connected to the HAFM server through a LAN. Please note that this is an example configuration only.

Operators at remote workstations can manage and monitor all products controlled by the HAFM server. Each active connection between a remote workstation and an HAFM server and managed products is called a session. A maximum of nine concurrent remote users (eight remote and one local HAFM server user) can log in to the *HAFM* application.

### Requirements for Remote Workstations

The HAFM is downloaded and installed on user workstations from the HAFM server. The remote workstations can be Windows 95, Windows 98, Windows 2000, Windows XP, HP-UX, AIX, Linux, or Solaris systems.

For the minimum system requirements for remote workstations, refer to the appendix in this guide for the appropriate operating system:

- [Appendix B](#) for Windows.
- [Appendix C](#) for Solaris.
- [Appendix D](#) for HP-UX, AIX, and Linux.

### Installing Software on Remote Workstations

For procedures to install HAFM software on remote user workstations and configure the workstations for connection to an HAFM server, refer to the appendix in this guide for the appropriate operating system.

- [Appendix B](#) for Windows.
- [Appendix C](#) for Solaris.
- [Appendix D](#) for HP-UX, AIX, and Linux.

## Displaying Remote Sessions

A maximum of nine concurrent users (eight remote and one local HAFM server user) can log in to the *HAFM* application. Display the current active sessions for the HAFM server that you are logged into via the **User Sessions** dialog box.

To display the **User Sessions** dialog box:

1. From the **View** menu, choose **User Sessions**.

The **User Sessions** dialog box displays.



User	Network Address	Connection Established
Administrator	pckjb1289.hp.com	Mar 25, 2002 8:41:29 AM

Close

**Figure 1–5: User Sessions dialog box**

The **User Sessions** dialog box displays active session information in this format:

- **User** — The name of the current user (in [Figure 1–5](#), Administrator).
- **Network Address** — The network address of the current user.
- **Connection Established** — The date and time that the session was established.

## Backing Up and Restoring Data

The backup and restore of critical HAFM data on the Windows system is provided by the Iomega *QuikSync* application, which is installed on the HAFM server when you install the Iomega Zip drive.

### Backup

During installation, QuikSync is automatically configured to mirror the contents of the `HAFMData` directory to the Zip drive any time the contents of that directory change or the server is restarted. Therefore, whenever you make a configuration change, add or remove a managed product, or make any other changes through the HAFM, the data in this directory is automatically backed up. The existing backup file is updated; no separate versions of the backup file are maintained.

**NOTE:** To ensure trouble-free backups, it is imperative that you leave the Zip drive installed in the HAFM server and leave a Zip disk in that drive.

When you log into Windows on the HAFM server, QuikSync starts automatically. Any data that has changed in the HAFMData directory while you were logged out will automatically be backed up.

The backed up data includes:

- All HAFM configuration (product definitions, user names, encrypted passwords, user rights, nicknames, session options, SNMP configuration, e-mail addresses, etc.).
- Logs, both for the HAFM and any Product Managers.
- Zoning library, including all zone sets and zone definitions.
- Firmware library.
- Call-home configuration information.

Since the configuration data for each individual product is stored in NVRAM on the product itself, there is a separate backup option provided in each Product Manager to save the product configuration to the HAFM server. If you perform a product configuration backup through the Product Manager, the configuration data is stored in the HAFMData directory and automatically mirrored to the QuikSync Zip disk.

The *QuikSync* application will not back up certain Windows configurations that need to be reconfigured on a newly-restored HAFM server, including:

- Windows user names and passwords.
- TCP/IP network configuration (IP address, Gateway address, DNS names, and so forth.)

You should use other means to back up this type of information.

The *QuikSync* application is included on the *HAFM Applications CD*, and automatically installed on the HAFM server during installation. A Zip disk dedicated to QuikSync is needed for each HAFM server and is included with the HAFM installation package.

## Using QuikSync

QuikSync is functioning to back up data when the **QuikSync** icon displays in the system tray in the right corner of the Windows task bar (Figure 1–6). This icon spins when data is writing to the Zip disk.



**Figure 1–6: QuikSync icon in Windows system tray**

If an icon does not display, you must enable the application using the procedure in the next section, [Enabling QuikSync](#).

## Enabling QuikSync

1. From the Windows **Start** menu, choose **Programs > Iomega QuikSync > QuikSync**.

The **Iomega QuikSync** dialog box displays.

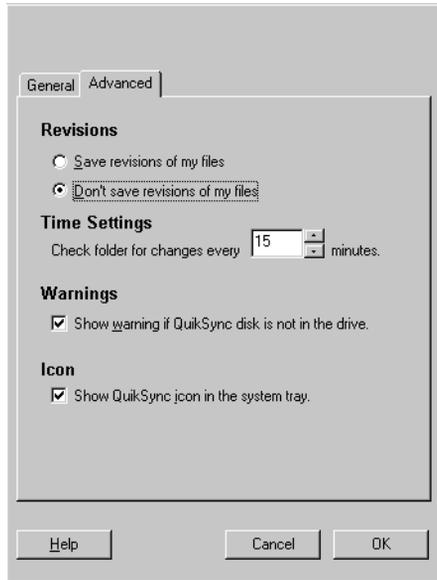
2. Click **On** to enable QuikSync.
3. Click **OK**.

## QuikSync Settings

Do not change the default settings for automatic backup of the HAFMData directory. If you feel that QuikSync is not functioning properly, check the settings using the following steps:

1. Open the **QuikSync** dialog box using one of these steps.
  - From the Windows **Start** menu, choose **Programs > Iomega QuikSync > QuikSync**.
  - Double-click the **QuikSync** icon on the Windows system bar in the lower right corner of the Windows desktop.
  - Right-click the **QuikSync** icon and choose **Settings** from the menu.
2. Verify that the dialog box shows the QuikSync **On** radio button enabled and the Source is `c:\HAFMData`.

- Click the **Advanced** tab. The following dialog box displays:



**Figure 1–7: Iomega QuikSync dialog box (Advanced tab)**

- Verify that the dialog box is configured exactly as displayed in [Figure 1–7](#).
- Click **OK**.

## Restore

In the event of a system failure, you will be able to return your database to a known state. To restore data from the backup disk to the HAFM server:

- Close down the *HAFM* application.
- Click the Windows **Start** button, then click **Programs > Windows Explorer**.  
The **Exploring** window displays.
- Copy the contents of the `HAFMData` directory on the Zip disk to the HAFM root directory (typically `c:\HAFMData`).
- Close the **Exploring** window. Leave the Zip disk in the drive for QuickSync backup.

5. Restart the HAFM server:
  - a. On the Windows taskbar, click **Start > Shut Down**.
  - b. On the **Shut Down Windows** dialog box, click **Restart the Computer** and click **Yes**.
  - c. When prompted, simultaneously press **Ctrl+Alt+Delete** to display the **Logon Information** dialog box.
  - d. Type your user name and password and click **OK**.
6. When the HAFM **Login** screen displays, enter your user name and password. Make sure that `localhost` is selected in the HAFM server field.
7. Click **Login** to open the HAFM.

## HAFM Menu Options

This user's guide provides information on the management options on the *HAFM* application only. Information on the *Product Manager* application is provided in the Product Manager user guide for your Switch or Director. Following are lists of options available under navigation control panel menus in all three applications. References are provided to the correct publication for detailed information on these options.

## High Availability Fabric Manager

The following options are available through the HAFM. For more information about these options, refer to [Chapter 3, Using the Menu Bar](#).

### View Tabs

- Products
- Fabrics

### Products Menu

- New
- Open
- Delete
- Modify
- Properties

- Logout
- Exit

### **Fabrics Menu**

- Rename
- Persist Fabric Topology
- Unpersist Fabric Topology
- Export Fabric Topology
- Show Route
- Hide Route
- Show Zone Members
- Show View Port
- Show Fabric Tree
- Enterprise Fabrics Mode (active if SANtegrity installed)
- Fabric Binding (active if SANtegrity installed)

### **View Menu**

- User Sessions
- Zoom
  - In
  - Out
  - Default
  - Fit in View
- Arrange Icons
  - By Name
  - By Severity
- Layout Icons
  - Circular
  - Spring

- Center in Topology
- Clear ISL Alert
- Clear All ISL Alerts
- Enable Fly Over Display

### **Configure Menu**

- Users
- Nicknames
- Sessions
- SNMP Agent
- Activate Zone Set
- Zoning Library
- Advanced Zoning
  - Deactivate Zone Set
  - Configure Default Zone

### **Logs Menu**

- Audit Log
- Event Log
- Session Log
- Product Status Log
- Fabric Log

### **Maintenance Menu**

- Configure E-Mail
- Test Remote Notification
- Configure Ethernet Events
- Configure Call Home Event Notification

## Help Menu

- Contents
- About

## Product Manager

The following options are available through the *Product Manager* application for your Switch or Director. For more information on these options, refer to the “Menu Bar” section of Chapter 1 in the Product Manager user guide for your Switch or Director.

### View Tabs

- Hardware
- Node List
- Port List
- Performance
- FRU List

### Product Menu

- Port (options available when port is selected)
  - Port Properties
  - Node Properties
  - Port Technology
  - Block Port
  - Enable Beacons
  - Port Diagnostics
  - Channel Wrap (S/390 mode only)
  - Swap Ports (S/390 mode only)
  - Clear Link Incident Alert(s)
  - Reset Port
  - Port Binding

- Clear Threshold Alerts(s)
- Display Options (Nickname and World Wide Name)
- FRU (options depend on FRU selected)
  - Open Port Card View (Director only)
  - FRU Properties
  - Switchover (Director only)
  - Enable Beaconing
  - Block All Ports
  - Unblock All Ports
  - Diagnostics
- Clear System Error Light
- Enable Unit Beaconing
- Properties
- Close

### **Configure Menu**

- Identification
- Operating Mode
- Operating Parameters
  - Switch
  - Fabric
- Switch Binding
  - Change State (only active if SANtegrity installed)
  - Edit Membership List (only active if SANtegrity installed)
- Ports

- Addresses (S/390 mode only)
  - Active
  - Stored
- SNMP Agent
- Management Server (only available if a management server feature is installed)
- Features
- Date/Time
- Threshold Alerts
- Export Configuration Report
- Enable Web Server
- Enable Telnet

### **Logs Menu**

- Audit Log
- Event Log
- Hardware Log
- Link Incident Log
- Threshold Alert Log

### **Maintenance Menu**

- Port Diagnostics
- Swap Ports (S/390 mode only)
- Data Collection
- IPL
- Set Online State
- Firmware Library
- Enable E-Mail Notification
- Enable Call Home Notification

- Backup & Restore Configuration
- Reset Configuration

### **Help Menu**

- Contents
- About

---

## Using the HAFM Window

This chapter provides a description of the High Availability Fabric Manager main window, except for the menu bar, which is covered in [Chapter 3](#).

### Window Overview

This section provides an over view of the HAFM main window.

### Illustrations Used in this Manual

Figures containing HAFM and Product Manager screens are included for illustration purposes only. These illustrations may not match exactly what you see on your server or workstation. Title bars have been removed from the illustrations, and fields in the illustrations may contain different data than in screens displayed on your system.

### Layout of Elements

The HAFM main window is shown in [Figure 2–1 on page 2-2](#). The Microsoft Windows title bar displays above the HAFM window. The HAFM main window is divided as follows:

- Title bar for the product, which is not shown in the illustrations.
- Menu bar, under the title bar and above the tool bar.
- Tool bar, under the menu bar and above the main panel.
- Main panel, which has two tabs: **Products** and **Fabrics**. When the **Fabrics** tab is selected, the main panel is divided into two panels (left and right).
- Status bar, at the bottom of the window.

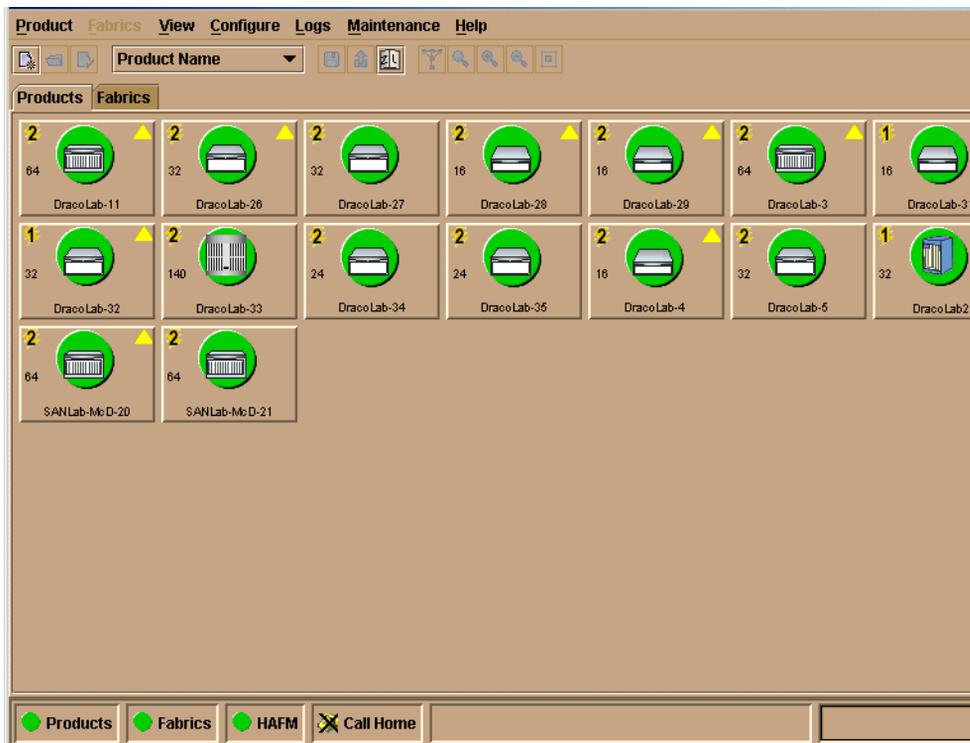


Figure 2–1: High Availability Fabric Manager main window

## Window Elements

The HAFM main window elements are shown in [Figure 2–1, High Availability Fabric Manager main window](#).

### Title Bar

The title bar identifies the product.

### Menu Bar

The menu bar provides actions for working with products, fabrics, views, configurations, logs, maintenance. A help menu is also provided. For a detailed description of the menu bar, refer to [Chapter 3](#).

## Tool Bar

The tool bar provides a number of icons for quick access to frequently used menu items, namely, commands to work with a product or to work with a fabric.

## Main Panel

The main panel has two tabs available at the top left for choosing a view: **Products** or **Fabrics**.

In the **Fabrics** view, the main panel is divided into two panels (left and right). The left panel shows the Fabric Tree. The right panel contains the view area. The right panel has tabs at the lower left of the view area for choosing between a **Topology** tab view or a **Zone Set** tab view. Figures and detailed descriptions appear later in this chapter.

## Status Bar

The status bar has icons for product status, fabric status, and HAFM server (HAFM) status, as well as a text area for messages.

## Tool Bar

The tool bar has a number of icons for quick access to frequently used menu items; namely, commands to work with a product or to work with a fabric.

## New Product Icon

The **New Product** icon ([Figure 2–2](#)) is available only in the **Products** view. This icon has the same functionality as choosing the **Products > New** option. It allows you to add a product to the HAFM manager.



Figure 2–2: New Product icon

## Open Product Icon

The **Open Product** icon ([Figure 2–3 on page 2-4](#)) is available in both the **Products** view and the **Fabrics** view:

- In the **Products** view, the **Open Product** icon is available when a product icon is selected.

- In the **Fabrics** view, the **Open Product** icon is available when the **Topology** tab is selected and a product icon is selected.

This button has the same functionality as choosing the **Product > Open** option. It allows you to open the Product Manager for a selected product.



Figure 2–3: Open Product icon

## Properties Icon

The **Properties** icon (Figure 2–4) is available in the **Products** view when you click a product icon. The icon is also available in the **Fabrics** view when the **Topology** tab is chosen. Click the product icon and then click the **Properties** icon to display the **Properties** dialog box for the selected product. In the **Fabrics** view, click outside the product icons before clicking the **Properties** icon to display the **Properties** dialog box for the selected fabric. Refer to [Properties on page 4-6](#) for a description of the **Product Properties** dialog box; refer to [Properties on page 5-6](#) for a description of the **Fabric Properties** dialog box.



Figure 2–4: Properties icon

## Display Drop-Down List

The **Display** drop-down list (Figure 2–5) contains five options: **Product Name**, **Network Address**, **World Wide Name**, **Domain ID**, and **Nickname**. This section describes these options.

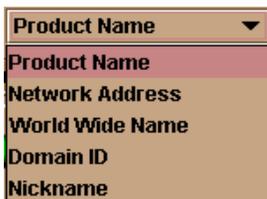


Figure 2–5: Display drop-down list

- **Product Name** — The name of the product configured through the **Configure Identification** dialog box in the Product Manager.
- **Network Address** — The internet protocol (IP) address or DNS host name of the product.
- **World Wide Name** — The product's 8-byte WWN.
- **Domain ID** — The product's domain identification number (1-31) assigned by the fabric.
- **Nickname** — The nickname if configured through the Configure Nicknames dialog box (**Configure** menu on menu bar). If the nickname is not configured, the WWN displays instead.

Refer to [Display Options on page 4-4](#) for details about the Display Option drop-down list in the **Products** view. Refer to [Display Drop-Down Box on page 5-27](#) for details in the **Fabrics** view.

## Persist Fabric Topology Icon

In the **Fabrics** view, the **Persist Fabric Topology** icon ([Figure 2–6](#)) is available when the **Topology** tab is selected. Choose the **Persist Fabric Topology** icon to display the **Persist Fabric** dialog box for the selected fabric. Enter a name for the fabric and click **OK**.

A persisted fabric is a “snapshot” of the current fabric. When the fabric configuration of interswitch links (ISLs) and products change from this snapshot, status indicators display in the **Topology** tab view area, and entries about fabric changes appear in the Fabric Log. Refer to [Persistent Fabrics on page 5-14](#) for information about persisted fabrics.



**Figure 2–6: Persist Fabric Topology icon**

## Export Fabric Topology Icon

In the **Fabrics** view, the **Export Fabric Topology** icon ([Figure 2-7](#)) is available when the **Topology** tab is selected. Click the **Export Fabric Topology** icon to display the **Export Fabric Topology** dialog box. Enter a name for the .xml file in the **File Name** field, select a folder on your C: drive or network drive where you want to save the .xml file, and then click **Save**. For additional information about this .xml file, refer to [Export Fabric Topology on page 5-18](#).



**Figure 2-7: Export Fabric Topology icon**

## Show Zoning Library Icon

The **Show Zoning Library** icon ([Figure 2-8](#)) is available both in both the **Products** view and the **Fabrics** view. Click the **Show Zoning Library** icon to open the **Zoning Library** dialog box.



**Figure 2-8: Show Zoning Library icon**

Use this dialog box to perform the major tasks for configuring zoning on the fabric:

- Configure zone sets by combining zone members (attached nodes)
- Configure zone sets by combining zones
- Clear zones
- Delete zones and zone sets
- Import and export zone sets
- Display zone properties
- Copy zones and zone sets
- Find zone members in zones
- Find zones in zone sets
- Display zone sets, zones, and zone members in the library

Refer to [Using the Zoning Library on page 6-11](#) for details on zoning and the use of this dialog box.

## Layout Icons

In the **Fabrics** view, the **Layout Icons** icon (Figure 2–9) is available when the **Topology** tab is selected. Click the **Layout Icons** icon to arrange the icons in the **Topology** tab view area in the default layout, either circular or spring. To change the original default layout (circular), choose the **Layout Icons** icon, and click **Spring**.

Spring shortens the length of the ISLs in the **Topology** tab view area, and springs the product icons closer together. Circular displays the fabric in a more spread out, circular layout.



Figure 2–9: Layout Icons icon

## Show View Port Icon

In the **Fabrics** view, the **Show View Port** icon (Figure 2–10) is available when the **Topology** tab is selected. Click the **Show View Port** icon to see a magnified view of the entire fabric that is in the **Topology** tab view area.

Click inside the view port, and move the mouse in any direction to adjust what you see in the **Topology** tab view area. The view port makes navigation easier when a large fabric is displayed in the **Topology** tab view area.



Figure 2–10: Show View Port icon

## Zoom In Icon

In the **Fabrics** view, the **Zoom In** icon (Figure 2–11) is available when the **Topology** tab is selected. Choose the **Zoom In** icon to increase the size of the fabric elements. Return to the original size by choosing **View > Zoom Default**.



Figure 2–11: Zoom In icon

## Zoom Out Icon

In the **Fabrics** view, the **Zoom Out** icon ([Figure 2–12](#)) is available when the **Topology** tab is selected. Choose the **Zoom Out** icon to decrease the size of the fabric elements in the **Topology** tab view area. Return to the original size by choosing **View > Zoom Default**.



Figure 2–12: Zoom Out icon

## Fit Topology in View Icon

In the **Fabrics** view, the **Fit Topology in View** icon ([Figure 2–13](#)) is available when the **Topology** tab is selected. Choose the **Fit Topology in View** icon to display the entire fabric in the **Topology** tab view area. Note that for larger fabrics, text and icons may be difficult to see. Return to the original size by choosing **View > Zoom Default**.



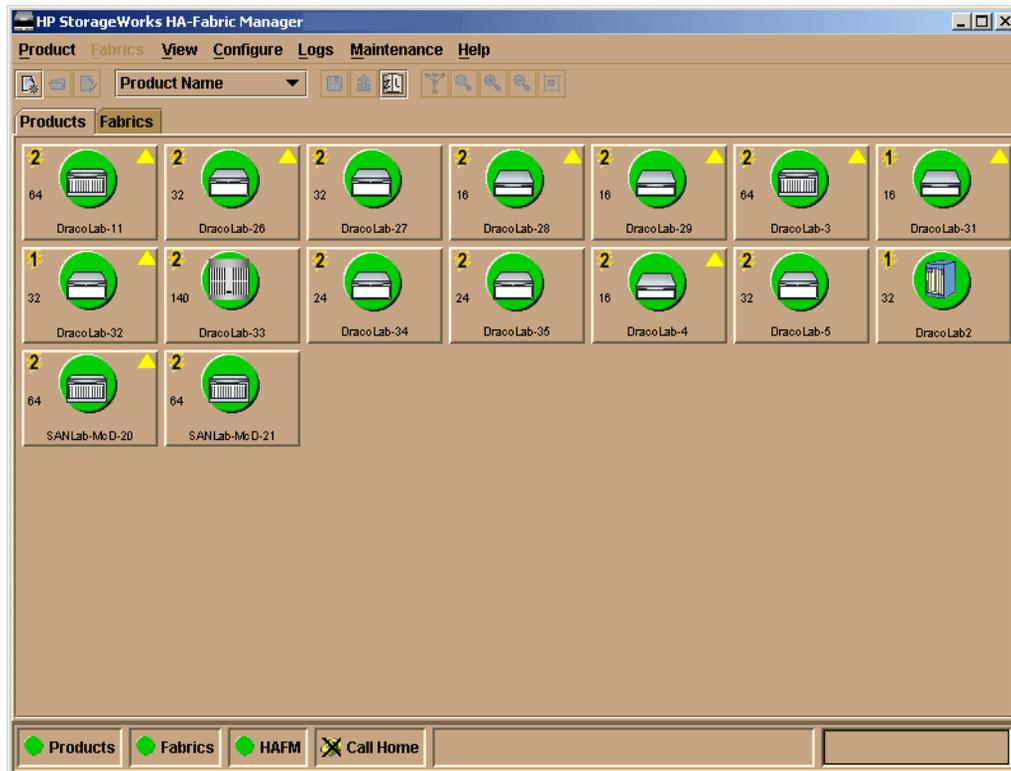
Figure 2–13: Fit Topology in View icon

## Main Panel

The HAFM main panel contains two views, which are displayed by choosing either the **Products** tab or the **Fabrics** tab.

## Products View

When you first access the HAFM, the **Products** view displays, as shown in [Figure 2–14 on page 2-9](#). To access the **Products** view from the **Fabrics** view, click the **Products** tab.



**Figure 2–14: Products view**

The **Products** view provides a graphical overview of all the products that you can manage and monitor through the HAFM. In a full-screen environment on an 800 x 600 resolution monitor, this panel displays up to 48 product icons.

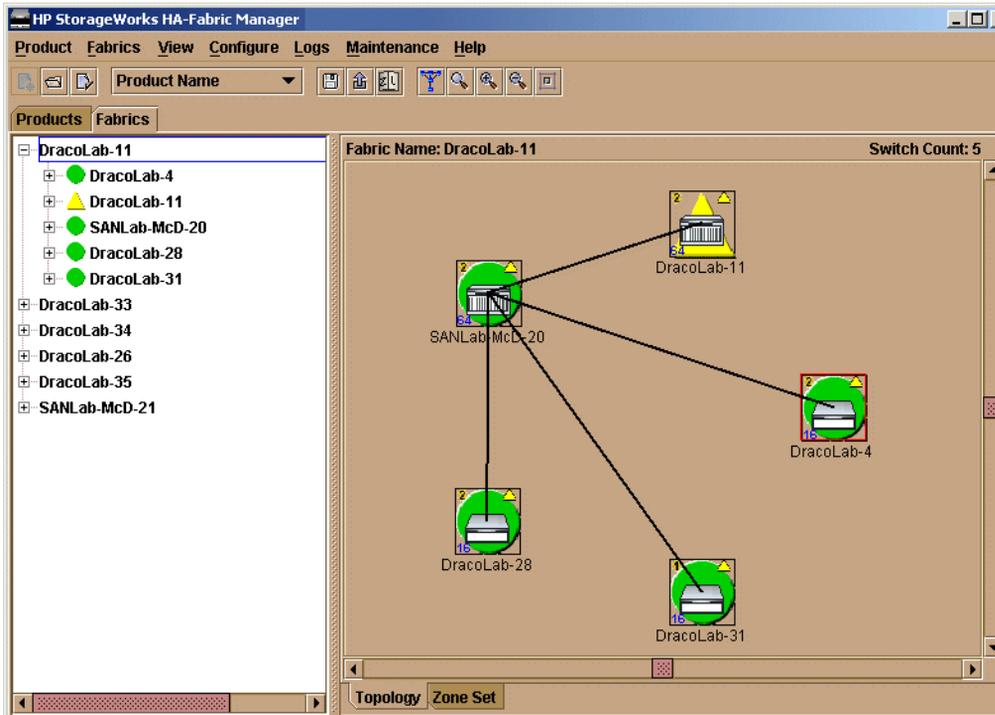
Right-click a product icon or a blank part of the view to display a pop-up menu. The options on the product icon menu enable you to administer the product for the HAFM. The options on the menu available in the background part of the view enable you to change product display options.

The **Products** view also provides access to the *Product Manager* application for each displayed product. Double-click a product icon to display its *Product Manager* application.

For a complete description of the **Products** view, refer to [Chapter 4](#).

## Fabrics View

To access the **Fabrics** view, click the **Fabrics** tab. The **Fabrics** view displays, as shown in [Figure 2–15, Fabrics view](#).



**Figure 2–15: Fabrics view**

The **Fabrics** view is divided into two panels. The left panel, the Fabric Tree, contains an expandable list of fabrics, products in fabrics, and nodes connected to products. The tree displays all fabrics currently known to the HAFM server.

The right panel is the view area. At the bottom of the view area are two tabs that change the view of the fabric: the **Topology** tab and the **Zone Set** tab.

In the **Topology** tab view area, right-click a product icon for a menu of options for the particular product. Right-click a blank part of the view to display a menu of options for the fabric.

In the **Zone Set** tab, the currently active zone set for fabrics that you chose in the Fabric Tree is displayed in the view area.

For a complete description of the **Fabrics** view, refer to [Chapter 5](#).

## Status Bar

The products, fabrics, and HAFM status elements use the symbols in table [Table 2–1](#) to indicate their operational state:

**Table 2–1: Operational States and Symbols**

Operational State	Symbol
<p><b>Operational</b></p> <p>Network communication is established. All products, fabrics, and the server are operational and no failures are indicated.</p>	
<p><b>Degraded</b></p> <p>At least one product, fabric, or the server under management is operating in a degraded mode and requires service. This condition typically occurs when a redundant FRU fails and the backup FRU is operational.</p>	
<p><b>Failed</b></p> <p>A product, fabric, or the server under management has failed and requires immediate service.</p>	
<p><b>Unknown</b></p> <p>The HAFM cannot determine product status because of a network communication failure between the product and the HAFM server, or because the managed product or fabric is not responding. The link may never have been established, or the link may have malfunctioned.</p>	

## Products Status

The product status box, labelled **Products**, indicates the operational state of the most critical product status of all the products managed by the HAFM. To find the one or more products that are causing the non-operational status, examine the product icons in the **Products** view.

The colored icons indicate the product status:

- A blinking red and yellow diamond means that the product has failed and requires immediate service.
- A yellow triangle means that the product is degraded, but is still performing as designed.
- A green circle means that the product is fully operational.
- A gray square means that the HAFM cannot determine product status.
- Double-click the icon to display the product status. This log records information when managed products change status. Each entry displays the date and time that the change occurred, the product network address, and the new status, such as Unknown, Operational, Degraded, or Failed. For details, refer to [High Availability Fabric Manger Product Status Log on page 7-6](#).

## Fabrics Status

The fabrics status box, labelled **Fabrics**, indicates the operational state of the most critical status of all the persisted fabrics known to the HAFM. To find the one or more persisted fabrics that are causing the non-operational status, examine the fabrics in the **Fabrics** view.

The colored icons indicate the persisted fabric status:

- A blinking red and yellow diamond means that the fabric has split into two or more fabrics.
- A yellow triangle means that all fabric connections are in tact; however, attention indicators appear on one or more ISLs in the **Topology** tab for the fabric.
- A green circle means that the fabric is fully operational and no attention indicators appear in an ISL in the **Topology** tab for the fabric.
- A gray square means that no information can be determined for the fabric.

Double-click the icon to display a fabric log. This log displays only if the fabric has been persisted. This log reflects the time and nature of significant changes in the managed fabric. Entries contain the date/time that the change took place, the type of change, and a description of the change. For details, refer to [High Availability Fabric Manager Fabric Log on page 7-7](#).

## HAFM Status

The **HAFM status** box indicates the operational state of the HAFM server into which the HAFM is logged. Position the mouse cursor over the status box to display one of the following messages in the text panel:

- Server status is Operational. The server is fully operational. The status symbol is a green circle.
- Server status is Degraded. The server is degraded and needs attention. The status symbol is a yellow triangle.
- Server status is Failed. The server has failed and requires immediate service. The status symbol is a red diamond.
- Server status is Unknown. The server status cannot be determined. The status symbol is a gray square.

## Text Panel

The text panel gives additional information about a command when the mouse moves over a tool-bar icon or over a menu item. This information is available even if the **Enable Fly Over Display** option in the **View** menu is not checked.



---

## Using the Menu Bar

This chapter provides a description of the following High Availability Fabric Manager menus on the menu bar:

- Product
- Fabrics
- View
- Configure
- Logs
- Maintenance
- Help

### Product

The **Product** menu displays options that are relevant to products.

### New

When the **Products** tab in the main panel is selected, the **New** option is available to display the **New Product** dialog box.

To identify a product to the HAFM and add its icon to the **Products** view, follow the steps in [New on page 4-4](#).

### Open

The **Open** option is only available when a product icon is highlighted in either the **Products** view or the **Fabrics** view.

To open the Product Manager for a product:

1. Click the product icon in either the **Products** view or **Fabrics** view to highlight the icon.

2. Click the **Product** menu.
3. Click the **Open** option.

Refer to [Accessing a Product Manager on page 4-7](#) for more information about opening a Product Manager.

## Delete

The **Delete** option is only available when the **Products** tab is selected.

To delete a product:

1. Click the product icon in the **Products** view to highlight the icon.
2. Click the **Product** menu.
3. Click the **Delete** option.
4. When a **Warning** dialog box displays asking if you want to remove the item from the system, click **Yes**.

The product icon is deleted from the **Products** view.



**CAUTION:** Deleting a product from the **Products** view removes all information about the product from the system. This includes configuration information, event logs, diagnostic information, and any other data maintained by the corresponding Product Manager.

---

## Modify

The **Modify** option is only available when the **Products** tab is selected.

To open the **Modify Network Address** dialog box for a product:

1. Click a product icon in the **Products** view to highlight the icon.
2. Click the **Product** menu.
3. Click the **Modify** option.

The **Modify Network Address** dialog box displays.

4. Use this dialog box to modify the network address of the product. Refer to [Modify on page 4-5](#) for information about entering the network address.

## Properties

The **Properties** icon is available in the **Products** view when you click a product icon. Click the product icon and then click the **Properties** icon to display the **Properties** dialog box for the selected product.

The **Properties** dialog box is also available in the **Fabrics** view when the **Topology** tab is selected. Click a product icon, then choose the **Fabrics** view. Click the **Properties** icon to display the **Properties** dialog box for the selected fabric.

Refer to [Properties on page 4-6](#) for a description of the **Product Properties** dialog box; refer to [Properties on page 5-6](#) for a description of the **Fabric Properties** dialog box.

## Logout

Choose this option to log out of the current session, close the HAFM, and close any open Product Managers. The **HP StorageWorks HAFM Login** dialog box displays.

## Exit

Choose this option to close the HAFM and any open Product Managers.

## Fabrics

When the **Fabrics** tab is selected, the **Fabrics** menu is available; the **Fabrics** menu is not available when the **Products** tab is selected. The **Fabrics** menu displays options that are relevant to fabrics.

## Rename

Choose this option to rename a Persistent Fabric. Until the fabric has been persisted, this option is not available.

Choose this option to display the **Rename Fabric** dialog box. Enter a name in the dialog box to display in the Fabric Tree and at the top of the **Topology** and **Zone Set** tabs.

## Persist Fabric Topology

Choose this option to display the **Persist Fabric** dialog box. Enter a name for the fabric, and click **OK** to “persist” the fabric. This saves a snapshot of the fabric’s current configuration (Switches, Directors, and ISLs) that displays in the **Topology** tab. Visual indicators display in the **Topology** tab as products, and ISLs are deleted or added to help you monitor the fabric’s status over time. This also creates a Fabric Log (available from the **Logs** menu on the menu bar) that tracks changes to the fabric over time. For details, refer to [Persistent Fabrics on page 5-14](#).

## Unpersist Fabric Topology

Choosing this option displays a warning that the Fabric Log will be lost if the fabric is unpersisted. Click **Yes** to unpersist the fabric, and the current view of the fabric displays in the tab’s view area without the fabric status indicators. The name of the fabric in the Fabric Tree changes back to the fabric’s WWN. A fabric status icon will not appear by the WWN.

## Export Fabric Topology

Choose this option to export the current fabric topology into an XML-formatted file. You can name the output file in the **Export Fabric Topology** dialog box that this option displays.

## Show Route

Choose this option to display the **Show Route** dialog box. Use this dialog box to view the path that Fibre Channel frames must take between two end devices in a multiswitch fabric. Refer to [Show Route on page 5-9](#) for the requirements to show a route and how to interpret the display.

## Hide Route

If a route has been displayed, the **Hide Route** option is available. Choose this option to remove the route currently displayed in the **Topology** tab view area.

## Show Zone Members

Choose this option to display the **Show Zone Members** dialog box. This dialog box displays a tree of all products in the selected fabric in the left panel. Click an icon by a product to expand the list of attached nodes. Choose a node, and the WWNs or nicknames (if configured) of nodes that are members of the same zone as the selected node display in the right panel. Refer to [Chapter 6](#) for details on zoning and zoning configuration.

## Show View Port

Click the check box to remove or display a checkmark. With a checkmark displayed, the **View Port** secondary window displays. Click inside the window and move the mouse to adjust the view of the fabric in the tab's view area.

Click the check box by the menu option when it contains a checkmark to remove the checkmark and remove the **View Port** secondary window from the screen.

## Show Fabric Tree

Click the check box to display a checkmark. With a checkmark displayed, the Fabric Tree displays on the left side of the **Fabrics** tab.

Click the check box when it contains a checkmark to remove the checkmark; the Fabric Tree is removed from the left side of the **Fabrics** tab.

## Enterprise Fabric Mode

This option is active only if the SANtegrity feature key is installed on each Switch in the fabric. For general instructions on enabling feature keys, refer to Chapter 3 in the appropriate Product Manager user manual for your Switch or Director product. Choose this option to display the **Enterprise Fabric Mode** dialog box. Use this dialog box to enable and disable Enterprise Fabric mode. Activating Enterprise Fabric Mode automatically enables the following features and operating parameters:

- Fabric Binding — SANtegrity feature.
- Switch Binding — SANtegrity feature.
- Rerouting Delay — parameter available through the **Configure Switch Parameters** dialog box. Refer to [Enable/Disable and Online State Functions on page 8-6](#) for more information.

- Domain RSCNs — parameter available through the **Configure Switch Parameters** dialog box. Refer to [Enable/Disable and Online State Functions on page 8-6](#) for more information.
- Insistent Domain ID — parameter available through the **Configure Switch Parameters** dialog box. Refer to [Enable/Disable and Online State Functions on page 8-6](#) for more information.

For complete instructions on using this option and the SANtegrity features, refer to [Enterprise Fabric Mode on page 8-12](#).

## Fabric Binding

This option is only active if the SANtegrity feature key is installed on each in the fabric. For general instructions on enabling feature keys, refer to Chapter 3 in the Product Manager user manual for your Switch or Director product. Once SANtegrity is installed and enabled, you can configure fabric binding for a specific fabric by selecting the fabric in **Fabrics** tab, then selecting **Fabric Binding** option from the **Fabrics** menu. This displays the **Fabric Binding** dialog box. Use this dialog box to enable and disable Fabric Binding and restrict unspecified Switches from attaching to the selected fabric.

For complete instructions on using this option, refer to [Fabric Binding on page 8-6](#).

## View

The **View** menu displays options that alter the view of application components.

## User Sessions

Choose the **User Sessions** option to display the **User Sessions** dialog box ([Figure 3-1](#)). This dialog box lists all the current management sessions, including the name of each user connection, the network address of the user, and the time when the connection was established. Click **Close** when you have finished reviewing the sessions.



User	Network Address	Connection Established
Administrator	pcjkb1289.hp.com	Mar 25, 2002 8:41:29 AM

Close

**Figure 3-1: User Sessions dialog box**

## Zoom

Choose the **In** and **Out** options from the **Zoom** option to increase and decrease the size of fabric elements. Return to the original view by selecting the **Default** option.

Choose the **Fit In View** option to display the entire fabric in the view area. Note that for larger fabrics, text and icons may be difficult to see. Choose **Default** from the **Zoom** menu to return to the original view, or use the **Out** option to selectively reduce the view.

## Arrange Icons

The **Arrange Icons** option is available only when the **Products** tab is selected.

Choose the **by Name** option from the **Arrange Icons** option to sort the product icons alphabetically by product name in the **Products** tab view area.

Choose the **by Severity** option from the **Arrange Icons** option to sort the product icons by status in the **Products** tab view area. The products are displayed from most to least critical: failed products, products with degraded status, and products with unknown operational status. Within these groupings, icons appear alphabetically by their network address (IP address or DNS host name) or product name, depending on the selected display option.

## Layout Icons

Choose the **Spring** option from the **Layout Icons** option to shorten the length of the ISLs in the view area and “spring” in the product icons closer together. Click the **Circular** option to display the fabric in the more spread-out, circular layout.

## Center in Topology

Choose a product icon in the **Topology** tab view area, and then select this option to center the product and surrounding portion of the fabric in the view area. Choosing this option without selecting an icon centers the entire fabric in the view area.

## Clear ISL Alert

Choose an ISL in the **Topology** tab view area, and then choose this option to clear the alert. This option is not available when there is no alert for the currently selected ISL. An alert only occurs in persisted fabrics when an ISL is removed from the fabric.

## Clear All ISL Alerts

Choose this option to clear all ISL alerts, as shown in the **Topology View**. This option is not available when there are no ISL alerts. An alert only occurs in persisted fabrics when an ISL is removed from the fabric.

## Enable Fly-Over Display

When the **Enable Fly-Over Display** option is enabled, move the cursor over fabric products in the tab's view area to display the product identification under the product icon. Moving the cursor over the ISL lines between products displays the actual number of ISLs between the products.

Disable the fly-over display by selecting and removing the check mark by the **Enable Fly-Over Display** option.

## Configure

The **Configure** menu displays options for managing the fabric.

## Users

To grant access to the HAFM, the administrator can assign user names, passwords, and access rights to users. The administrator can configure up to sixteen users in the HAFM, but no more than nine users (eight remote and one the local user) can simultaneously access one HAFM server.

## User Rights

Specific levels of access, called “user rights,” are assigned to Product Manager users by the HAFM's system administrator in the *HAFM* application.

**NOTE:** The HAFM's system administrator has view rights only while operating in a specific *Product Manager* application. Conversely, a Product Manager's product administrator has view rights only while operating in the *HAFM* application.

There are five levels of access or “user rights” that can be assigned to specific users:

- System Administrator
- Product Administrator
- Maintenance
- Operator
- View

By default, all users have View rights, which allow the viewing of configurations, but not the changing of configurations. View rights cannot be removed.

The users with System Administrator rights can make all control and configuration changes implemented through the *HAFM* application.

## User Rights for Specific Functions

Table 3–1 lists the specific functions available to HAFM users who have been assigned the user rights of System Administrator, Product Administrator, Maintenance, or Operator. If a user's assigned rights do not include the right to perform a specific operation, a Not Authorized message displays when the operation is attempted.

**Table 3–1: User Rights for HAFM Functions**

Rights	System Administrator	Product Administrator	Maintenance	Operator
Clear Logs	X			
Configure Call-Home Event Notification	X		X	
Configure E-Mail	X		X	
Configure Ethernet Events	X		X	
Configure Nicknames	X			
Configure Product	X			
Configure Session Options	X			
Configure SNMP	X			
Configure User	X			
Configure Zoning	X			

**Table 3–1: User Rights for HAFM Functions (Continued)**

<b>Rights</b>	<b>System Administrator</b>	<b>Product Administrator</b>	<b>Maintenance</b>	<b>Operator</b>
Display Options	X		X	X
Enterprise Fabric Mode	X			
Export Fabric Topology	X			
Export Logs	X			
Fabric Zoom	X			
Persist Fabric	X			
Remote Notification	X		X	
Show Route	X			
Show Zone	X			
View Logs	X			X

### Open the Configure User Dialog Box

1. Choose **Configure > Users**.

The **Configure Users** dialog box displays ([Figure 3–2 on page 3-11](#)).

2. Use the appropriate buttons along the bottom of the dialog box to administer users.



Figure 3-2: Configure Users dialog box

## Add New User

Use the **New User** dialog box (Figure 3-3) to create new users for the HAFM. Assign a user name, a password, and certain permissions, or “rights,” to each user configured.

1. Choose **Configure > Users**.

The **Configure Users** dialog box displays (Figure 3-2 on page 3-11).

2. Click **New**.

The **New User** dialog box displays (Figure 3-3).

**User name:**

**Password:**

**Confirm Password:**

**Description:**

**Rights Available:**

- System Administrator
- Product Administrator
- Operator
- Maintenance

**Rights Granted:**

[View]

Buttons: Add >> << Remove OK Cancel

Figure 3-3: New User dialog box

3. In the **User name** field, enter a user name of 16 characters or less.  
The user name is case-sensitive.
4. In the **Password** box, enter a password of 16 characters or less for the new user.  
The password is case-sensitive.
5. In the **Confirm Password** box, re-enter the password exactly as you entered it in the **Password** box.
6. (Optional) In the **Description** field, provide a description of the user (such as employee number, department, and function).

Assign rights to the new user using the **Add** and **Remove** buttons. Select a right in the Rights Available list, and click **Add** to display the right in the Rights Granted list. For a discussion of user rights, refer to [Managing Remote Access to the HAFM Server on page 1-7](#).

By default, view rights are granted to all users.

7. Click **OK** to activate the administration and close the **New User** dialog box.
8. Click **Close** to close the **Configure Users** dialog box.

## Open the Modify User Dialog Box

1. Choose **Configure > Users**.
- The **Configure Users** dialog box displays ([Figure 3–2 on page 3-11](#)).
2. In the **User** column, select the user whose parameters are to be changed.
3. Click **Modify**.

The **Modify User** dialog box displays, with the name of the selected user in the User name field ([Figure 3–4](#)).

Figure 3–4: Modify User dialog box

## Modify User Parameters

The **Modify User** dialog box (Figure 3–4) is used to change the password, description, and rights for those users already configured in the HAFM.

1. In the **Password** field, delete the current password and enter another password of 16 characters or less.

The password is case-sensitive.

2. In the **Confirm Password** field, re-enter the new password exactly as it was entered in the **Password** field.
3. (Optional) In the **Description** field, change the description of the user (such as employee number, department, and function) as necessary.
4. Re-assign rights to the user, using the Add and Remove buttons to display the right in the Rights Granted list. Refer to [User Rights on page 3-8](#) for definitions of user rights.

By default, view rights are granted to all users.

5. Click **OK** to activate the administration and close the dialog box.
6. Click **Close** to close the **Configure Users** dialog box.

## Delete User

Delete users from the system through the **Configure Users** dialog box (Figure 3–2 on page 3-11).

1. From the **Configure** menu, choose **Users**.

The **Configure Users** dialog box displays (Figure 3–2 on page 3-11).

2. In the **User** column, select the user to be deleted.
3. Click **Delete**.

A **Warning** dialog box opens confirming the deletion (Figure 3–5).



**Figure 3–5: Delete User Warning**

4. Click **Yes** to delete the user from the HAFM.
5. Click **Close** to close the **Configure Users** dialog box.

## Nicknames

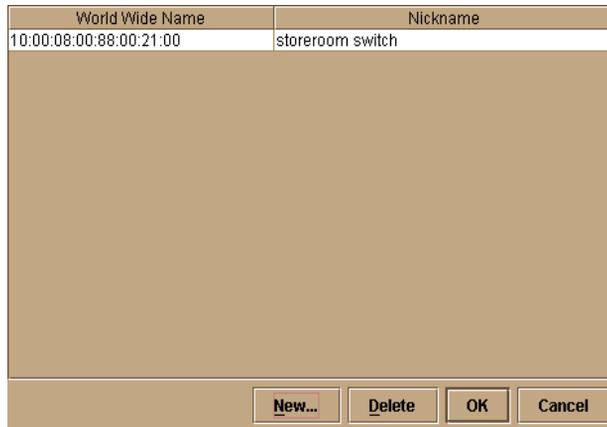
Nicknames replace the standard 8-byte World Wide Names of Switches, Directors, and attached nodes. By setting a nickname, you can assign a more meaningful name than a WWN. When you assign a nickname, the nickname replaces the World Wide Name in the HAFM views.

**NOTE:** Nicknames may have a maximum of 32 characters.

To add a nickname:

1. Choose **Configure > Nicknames**.

The **Configure Nicknames** dialog box displays with existing nicknames that have already been configured (Figure 3–6).



**Figure 3-6: Configure Nicknames dialog box**

The left column in the dialog box shows the selected WWN, while the right column shows the assigned nickname.

2. Click **New** to add a new nickname.

The **Add Nickname** dialog box displays (Figure 3-7).



**Figure 3-7: Add Nickname dialog box (Detached Node)**

3. To add a detached node (node currently not connected to a product port):
  - a. Choose **Manually type in World Wide Name**.
  - b. Click **OK**. A blank row is added to the list in the **Configure Nicknames** dialog box.



5. Click **OK** to close the **Configure Nicknames** dialog box.

To delete a nickname:

1. In the **Configure Nicknames** dialog box, select the nickname that you want to delete (Figure 3–6 on page 3-15).
2. Click **Delete**.
3. Click **Yes** to confirm that you want to delete the nickname.
4. Click **OK** to close the **Configure Nicknames** dialog box.

## Sessions

Sessions allow access to the HAFM server from all workstations or only from specific remote workstations through the **Configure Sessions** dialog box. A maximum of nine concurrent users (eight remote and one local HAFM server user) can log in to the *HAFM* application.

1. Choose **Configure > Sessions**.

The **Configure Sessions** dialog box (Figure 3–9) displays.

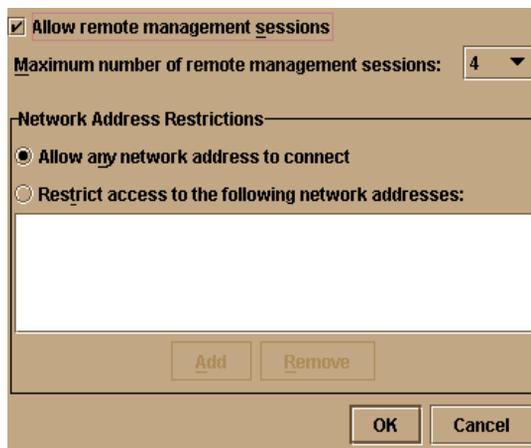


Figure 3–9: Configure Sessions dialog box

2. Click the **Allow remote management sessions** check box (a check mark displays) to allow remote access from remote workstations. If you do not choose this option, remote access is blocked even if you provide access information in other parts of this dialog box. Use this check box as a method to prohibit remote access while saving the current access administration in this dialog box.

**NOTE:** If this option is not selected, existing sessions will not terminate, but future sessions will be prohibited.

3. Select the number of remote management sessions to be allowed from the **Maximum number of remote management sessions** list.
4. If you do not want to restrict access to the HAFM, click **Allow any network address to connect** and click **OK**.
5. If you want to restrict access to an address:
  - a. Click **Restrict access to the following network addresses**.
  - b. Click **Add**. The **New Network Address** dialog box displays.
  - c. Enter the IP address of the remote workstation to be authorized in the **Network Address** field.
  - d. Click **OK**. The **New Network Address** dialog box closes.
  - e. Click **OK** on the **Configure Sessions** dialog box.
6. If you want to remove the access currently granted to a remote workstation:
  - a. Click **Restrict access to the following network addresses**. The IP addresses display in the Network Address Restrictions area.
  - b. Select the address to be deleted.
  - c. Click **Remove**.
  - d. Click **Yes** in the **Warning** dialog box.
  - e. Click **OK** to save the required changes.

## SNMP Agent

Choose the **SNMP Agent** option to open the **Configure SNMP** dialog box that allows you to configure the SNMP agent that runs on the HAFM server and implements the Fibre Alliance MIB.

The HAFM server software contains a simple network management protocol (SNMP) agent component. The HAFM SNMP agent instruments the objects defined in the Fibre Channel Management (FCMGMT) Management Information Base (MIB) Version 2.2 and a small number of objects defined in MIB II. Through instrumentation of these MIB objects, the agent acts as a translator of information stored on the HAFM server and attached Directors into a form usable by SNMP management stations such as HP OpenView. Refer to the *hp StorageWorks SNMP reference guide for directors and edge switches*.

Use these steps to configure the SNMP agent that runs on the HAFM server and implements the Fibre Alliance MIB.

You can configure network addresses and community names for up to 12 SNMP trap recipients, which receive messages through SNMP for specific events that occur on the HAFM server.

When configuring SNMP, you can configure just the community names of valid SNMP management stations. In this case, you do not need to fill in the **Trap Recipient** column or the **UDP Port Number** column.

To configure and enable SNMP traps, use the following steps:

1. Choose **Configure > SNMP Agent**.

The **Configure SNMP** dialog box displays (Figure 3–10).

Community Name	Write Authorization	Trap Recipient	Active	UDP Port Number
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	
	<input type="checkbox"/>		<input type="checkbox"/>	

**Figure 3–10: Configure SNMP dialog box**

2. Click in the **Community Name** column and enter the SNMP community name for a trap recipient. This name defines the community name that SNMP managers use for reading variables from or writing variables to the HAFM server. This name must be 64 characters or less.

To modify existing fields in this dialog box, click in the field and enter your changes.

3. Select the **Write Authorization** check box to grant or deny the configured SNMP management station write authorization. When this option is selected, an administrator at an SNMP management station has write permissions for writable MIB objects on the HAFM server.
4. Click in the **Trap Recipient** column, and enter the IP address or DNS host name for a trap recipient (SNMP management station). This must be 64 characters or less.
5. If you want the trap recipient to be an active recipient, click the check box in the **Active** column to add a checkmark. If you want to configure the recipient and then activate the recipient at a later time, leave the check box empty.
6. To override the default User Datagram Protocol (UDP) port number for a trap recipient with any legal, decimal UDP number, enter the UDP port number in the **UDP Port Number** column.
7. To enable or disable the SNMP agent to capture events, select the **Enable SNMP Agent on server** check box.
8. To enable or disable authorization traps to be sent when unauthorized management stations try to access SNMP information through the HAFM server, select the **Enable Authorization Traps** check box.
9. Click **OK** to accept and activate the data.

## Activate Zone Set

Opens the **Activate Zone Set** dialog box that allows you to select and activate configured zone sets. Only one zone set in the fabric can be active at one time. Activating a zone set replaces the current active zone set with the one you activate.

The dialog box displays all zone sets currently configured for the fabric. You can click **Next** to display additional screens that help you through the activation process or **Previous** to view previous screens. Refer to [Activate Zone Sets on page 6-26](#) for details on zoning and use of this dialog box.

## Zoning Library

Opens the **Zoning Library** dialog box. Use this dialog box to perform the major tasks for configuring zoning on the fabric:

- Configure zone sets by combining zone members (attached nodes)
- Configure zone sets by combining zones
- Clear zones
- Delete zones and zone sets
- Import and export zone sets
- Display zone and zone set properties
- Copy zones and zone sets
- Find zone members in zones
- Find zones in zone sets
- Display zone sets, zones, and zone members in library

Refer to [Using the Zoning Library on page 6-11](#) for details on zoning and use of this dialog box.

## Advanced Zoning

Choose this option to open a secondary menu with the following options:

- **Deactivate Zone Set** — Click this option to display the **Deactivate Zone Set** dialog box. Use this dialog box to deactivate the current active zone set. Click **Start** to begin the process. Messages display to indicate deactivation status. When the **Close** button displays, you can close the dialog box. Refer to [Default Zone on page 6-7](#) for details on zoning and use of this dialog box.
- **Configure Default Zone** — Click this option to display the **Configure Default Zone** dialog box. Use this dialog box to enable and disable the default zone. Click **Start** to begin the process. Messages display to indicate process status. When the **Close** button displays, you can close the dialog box. Refer to [Default Zone on page 6-7](#) for details on zoning and use of this dialog box.

## Logs

Sorting log entries is the same for all logs. Sort log entries in columns by clicking a column heading. For columns that contain text, the columns are sorted alphabetically. For columns with data, such as date and time, the columns are sorted by date. The default view for all logs is to show the most current event based on date and time when the event occurred.

A down arrow in the header indicates sorting in descending order. An up arrow indicates sorting in ascending order. Click once to sort. Click again to reverse the sort.

## Audit Log

Choose this option to display the Audit Log, which contains a history of user actions performed through the HAFM. Refer to [High Availability Fabric Manager Audit Log on page 7-2](#) for a detailed description of the Audit Log.

## Event Log

Choose this option to display the Event Log, which lists errors related to HAFM operation. Refer to [High Availability Fabric Manager Event Log on page 7-3](#) for a detailed description of the Event Log.

## Session Log

Choose this option to display the Session Log, which lists the users who have logged in and logged out of the HAFM server. Refer to [High Availability Fabric Manager Session Log on page 7-5](#) for a detailed description of the Session Log.

## Product Status Log

Choose this option to display the Product Status Log, which records the operational status changes of each managed product. Refer to [High Availability Fabric Manager Product Status Log on page 7-6](#) for a detailed description of the Product Status Log.

## Fabric Log

Choose this option to display the Fabric Log, which records all the significant changes that have occurred in the managed fabric. This only displays if a fabric was persisted. Refer to [High Availability Fabric Manager Fabric Log on page 7-7](#) for a detailed description of the Fabric Log.

## Maintenance

The **Maintenance** menu provides tools for setting remote communication options.

### Configure E-Mail

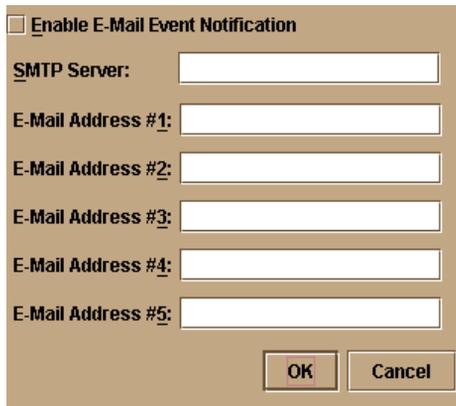
Configure up to five e-mail addresses for administrators or others who should be notified of significant product events. The events that initiate e-mail notification are specific to each managed product. Some examples of events that initiate e-mail notification are:

- Change in system operational status.
- Problem detection, such as a failed field-replaceable unit (FRU).
- Problem correction.
- State change that requires user attention or a report to product administrator or service representative.

To display and modify e-mail notification:

1. Choose **Maintenance > Configure E-Mail**.

The **Configure E-Mail** dialog box displays ([Figure 3–11](#)).



**Figure 3–11: Configure E-Mail dialog box**

2. Enter an IP address or DNS host name for your SMTP server.
3. Enter up to five e-mail addresses for personnel who should be notified automatically of system events.

4. To enable or disable e-mail notification, choose the **Enable E-Mail Event Notification** check box.
5. This will enable e-mail notification for all Product Managers if e-mail notification is enabled through each Product Manager's **Enable E-Mail Notification** option. If the **Enable E-Mail Event Notification** check box is not selected, e-mail notification is disabled for all Product Managers.
6. Click **OK** to confirm the information that you have entered.

The SMTP server address and e-mail addresses can be up to 64 characters.

## Test Remote Notification

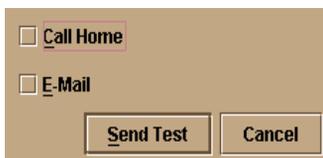
Use the test remote notification feature to test the call-home feature and the current configuration parameters for the e-mail notification feature.

- To use this feature you must first configure telephone numbers and other information for the Call-Home feature. In LAN-based environments, call home event notification requires installation of Proactive Service software. This service is offered at no additional charge for subsystems covered under an on-site warranty or an on-site storage hardware support contract. To register or order Proactive Service software, contact your HP Customer Service representative.
- Configure Call-Home event notification through the HAFM **Maintenance** menu (refer to [Configure Call-Home Event Notification on page 3-26](#)).
- Configure e-mail through the HAFM **Maintenance** menu (refer to [Configure E-Mail on page 3-23](#)).
- Enable Call-Home event notification through the Product Manager **Maintenance** menu.

Once you have run the test, you should contact the call-home recipient or the e-mail recipient to confirm that a message was received.

1. Choose **Maintenance > Test Remote Notification**.

The **Test Remote Notification** dialog box displays ([Figure 3-12](#)).



**Figure 3-12: Test Remote Notification dialog box**

You can check remote notification for one or both remote communication methods.

2. To test the call-home feature, click the **Call Home** check box.
3. To test the e-mail notification feature, click the **E-Mail** check box.
4. Click **Send Test**.

A message box displays indicating that the test was initiated ([Figure 3–13](#)).



**Figure 3–13: Results of Remote Notification Test**

5. Click **OK** to close the message box.

## Configure Ethernet Events

An Ethernet event occurs when the Ethernet link between the HAFM server and the managed product is dropped. You can configure Ethernet events for all managed products and set a specific time interval for an event to be generated after the communication drops.

1. Choose **Maintenance > Configure Ethernet Events**.

The **Configure Ethernet Events** dialog box displays ([Figure 3–14](#)).



**Figure 3–14: Configure Ethernet Events dialog box**

2. To enable Ethernet events, click the **Enable ethernet events** check box.
3. To change the default timeout of 30 minutes, enter a new value in the **Ethernet timeout** field. The value must be between 10 and 120.

4. Click **OK** to accept and activate the data.

If e-mail notification is also enabled, an e-mail will be sent if the HAFM cannot communicate with a product.

If call-home notification is also enabled, a call-home notification will be generated if the HAFM cannot communicate with a product.

## Configure Call-Home Event Notification

Call-home notification, which you configure for each product through the Product Manager, enables the HAFM server to automatically contact a support center to report system problems. The support center server accepts calls from the HAFM server, logs reported events, and can notify one or more support center representatives.

To use this feature, you must first configure telephone numbers and other information for the modem-based call-home feature through the Windows dial-up networking application. Refer to the HAFM server installation guide for details.

To enable and disable call-home notification for system problems, use the following procedure:

1. Choose **Maintenance > Enable Call Home Event Notification**.

The **Enable Call Home Event Notification** dialog box displays.

2. Check the **Enable Call Home Event Notification** check box to enable the feature.
3. To test call-home notification, click **Send Test**; otherwise, click **OK**.

Note that after you enable call-home in the HAFM, you must enable the feature for each specific Switch or product that will use this feature in the *Product Manager* application for that product.

## Help

The **Help** menu provides access to two options:

- **Contents** — Choose this option to open the HAFM Online Help window. The Contents, Index, and Glossary items in the left frame of the Help window are hyperlinked to topic text and graphics in the right frame.
- **About** — Choose this option to display version and copyright information for the *HAFM* application.

---

## Using the Products View

This chapter provides information to help you use features in the Products tab.

### Overview

Display the **Products** view by clicking the **Products** tab on the High Availability Fabric Manager window. This is the default tab for the HAFM. It displays icons of all products, such as Switches and Directors, that you can manage through the *HAFM* and *Product Manager* applications.

The following figure illustrates the **Products** tab displayed in the HAFM window.

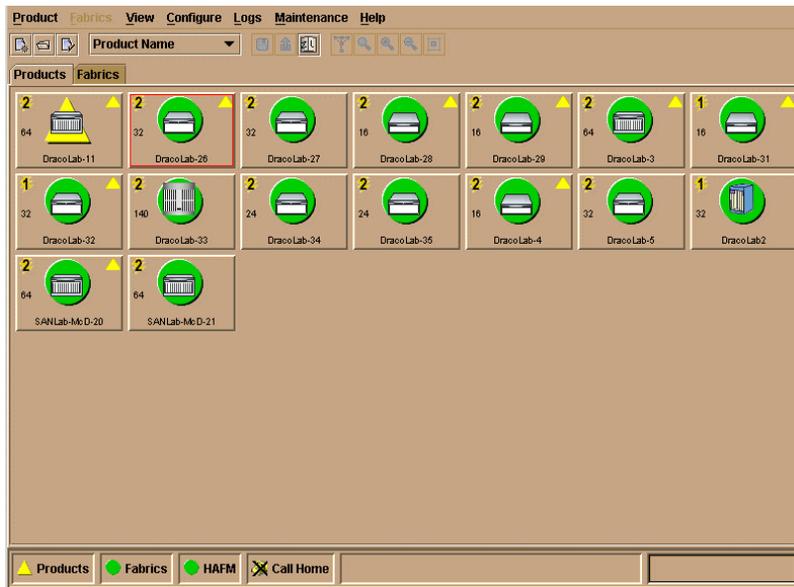


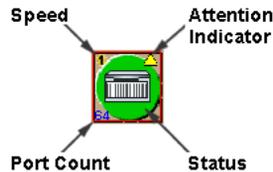
Figure 4–1: Products view

## Product Icon Display

The **Products** view can display up to 48 product icons. Use the scroll bar to display any icons that are out of view.

The view in [Figure 4–1](#) displays Director and Edge Switch product icons. You can also determine the product represented by the icon by right-clicking the icon and choosing **Properties** or double clicking the icon to display the product's **HAFM Properties** dialog box. When the dialog box displays, verify the product listed in the Product Type field.

The icon in [Figure 4–2](#) is an icon for the Director 2/64.



**Figure 4–2: Director 2/64 Product icon**

## Icon Description

Information in each product icon includes:

- Product data speed setting (upper left corner). This speed, either 1 or 2 Gb/sec, is configured through the *Product Manager* application for a specific Director. Switches have 1 or 2 GB/sec speeds that you cannot configure.
- Attention indicator (upper right corner). A yellow triangle in the upper right corner means that product requires attention. Open the *Product Manager* application for the Director by double-clicking on the icon to find out more information.
- Port count. The port count displayed is the maximum number of ports for the product, not the enabled number of ports.

- Status indicator. This is the colored symbol behind the product's illustration in the icon.
    - A blinking red and yellow diamond means that the product has failed and requires immediate service.
    - A yellow triangle means that the product is degraded, but is still performing as designed.
    - A green circle means that the product is fully operational.
    - A gray square means that the HAFM cannot determine product status.
- If a status symbol does not display behind the product, the product is not managed by the HAFM server to which you are logged in.

The product name or network address displays at the bottom of the icon. Switch between the name and address through **Display Options** in the view pop-up menu. Refer to [View Pop-Up Menu](#) in the next section for details.

**NOTE:** If the product name displays inside the icon, moving the cursor over the icon displays the network address below the icon. If the network address displays inside the icon, moving the cursor over the icon displays the product name below the icon.

The most critical status reflected by a product in the view is also reflected in the *Products* status bar in the left corner of the HAFM status bar. For example, if a product is degraded, a yellow triangle displays in the status bar.

## View Context Menus

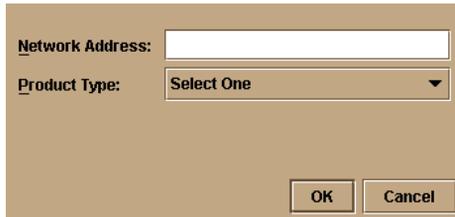
Two pop-up menus are available by right-clicking in the view. One is available when you right-click the view, away from a product icon, and the other when you right-click a product icon. Refer to [Product Icon Pop-Up Menu on page 4-5](#).

## View Pop-Up Menu

The pop-up menu that displays when you right-click the view area (away from a product icon) enables you to add products, change product icon labels, and sort product icons in the view. Use the following procedures to use these menu options.

## New

Choose this option to display the **New Product** dialog box. Use this dialog box to identify a product to the HAFM and add its icon to the **Product** view.

The image shows a dialog box titled "New Product". It has a light brown background. At the top left, there is a label "Network Address:" followed by a white text input field. Below that, there is a label "Product Type:" followed by a dropdown menu showing "Select One" with a downward arrow. At the bottom right, there are two buttons: "OK" and "Cancel".

**Figure 4–3: New Product dialog box**

1. Enter a valid IP address or domain name server (DNS) host name in the **Network Address** field. A valid IP address is in the form `nnn.nnn.nnn.nnn`, where `nnn` is a decimal in the range 0-255.
2. Select the product type from the **Product Type** list.
3. Click **OK**.

A new icon for the product displays in the Products view.

**NOTE:** You can also choose the **New** option while in the **Products** view from the **Product** menu on the menu bar at the top of the **HAFM** window.

## Display Options

This option displays additional options for displaying the label beneath the icon.

- **Product Name** — Choose this option to display the product’s name in the icon label. Change a product’s name through the *Product Manager* application. Refer to the Product Manager user guide for your Switch or Director model for instructions.
- **Network Address** — Choose this option to display the product’s IP address or DNS (domain name server) host name in the icon label. Configure network addresses through the **New Product** dialog box.

## Sort Options

This option displays additional options for displaying product icons.

- **By Name** — Arrange icons alphabetically, by product name.
- **By Severity** — (Default). Arrange icons according to the product's operating status. Failed products appear first, followed by products with degraded, then unknown, then fully operational status. Within these groupings, icons appear alphabetically by their network address (IP address or DNS host name) or product name, depending on the selected display option.

## Product Icon Pop-Up Menu

Access a menu for the product icon by right-clicking the icon.

### Open

Choose this option to open the Product Manager for the selected product. Refer to [Accessing a Product Manager on page 4-7](#) for more information.

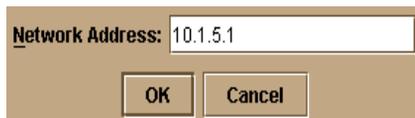
### Modify

Choose this option to display the **Modify Network Address** dialog box. Use this dialog box to modify the network address.

To modify existing product properties, use the following steps:

1. In the **Products** view, right-click a product icon for which you want to change administration and choose **Modify**.

The **Modify Network Address** dialog box displays ([Figure 4-4](#)). This dialog box contains the network address of the product.



**Figure 4-4: Modify Network Address dialog box**

2. Change the address in the **Network Address** field.
3. Click **OK**.

## Delete

1. Choose this option to delete the product from the **Products** view.
2. When a **Warning** dialog box displays asking if you want to remove the item from the system, click **Yes**.

The product icon is deleted from the **Products** view.



**CAUTION:** Deleting a product from the **Products** view removes all information about the product from the system. This includes configuration information, event logs, diagnostic information, and any other data maintained by the corresponding Product Manager.

---

## Properties

Click this option to display the product's **Properties** dialog box, which lists the product name, location, contact person, description, product type, network address, and operational status for the product. The product name, location, contact person, and description are configured through the Product Manager. Refer to the Product Manager user guide for your Switch or Director for instructions. The network address is configured in the **New Product** dialog box in the HAFM.

You can display product properties through the **Products** view. To display information about a managed product:

1. Right-click a product's icon in the **Products** view and choose **Properties**.

The product's **Properties** dialog box displays ([Figure 4-5 on page 4-6](#)).

<b>Name:</b>	Undefined
<b>Location:</b>	
<b>Contact:</b>	
<b>Description:</b>	
<b>Product Type:</b>	Director-64
<b>Network Address:</b>	localhost
<b>Status:</b>	Operational

Close

**Figure 4-5: Product Properties dialog box**

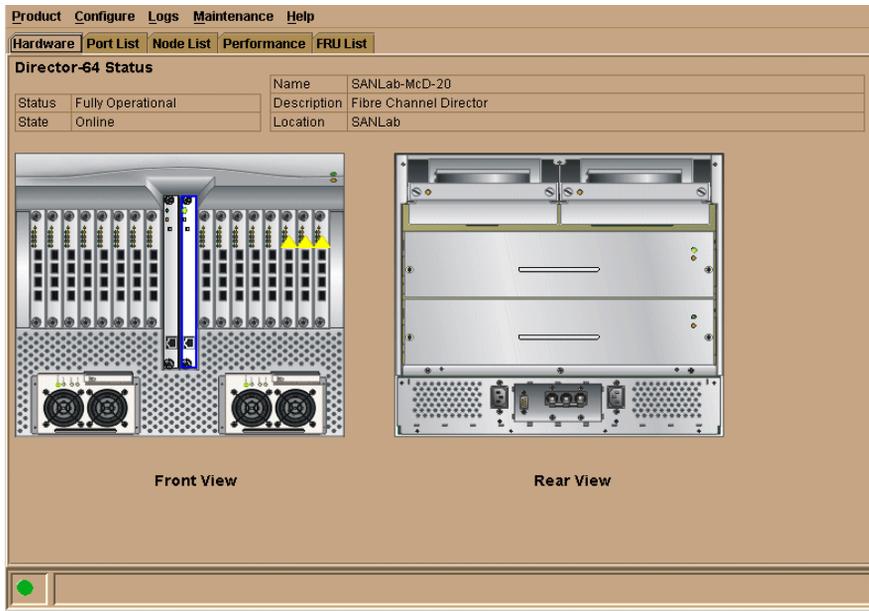
The Switch or Director **Properties** dialog box displays information about a product managed by the HAFM including the following:

- Name of the product as configured through the **Configure Identification** dialog box in the *Product Manager* application.
- Location of the product as configured through the **Configure Identification** dialog box in the *Product Manager* application.
- Contact person for the product as configured through the **Configure Identification** dialog box in the *Product Manager* application.
- Description of the product as configured through the **Configure Identification** dialog box in the *Product Manager* application.
- Product type, for example “Edge-32,” as configured through the HAFM’s **New Product** dialog box.
- Network address as configured through the HAFM’s New Product dialog box.
- Current product operational status:
  - **Operational** — Product is fully operational.
  - **Degraded** — Product needs attention. Typically, this displays when a redundant FRU fails, but the product is still performing as designed.
  - **Failed** — Product needs immediate attention.
  - **Unknown** — The HAFM cannot determine product status because of a network communication failure between the product and the HAFM server, or because the managed product is not responding.

## Accessing a Product Manager

There are three ways to access a product’s Product Manager through the **Products** view.

- Double-click the product icon.
- Right-click the product icon and choose **Open**.
- Click a product icon to select it, then click the Open Product icon from the tool bar.



**Figure 4–6: Director 2/64 Product Manager window**

The Product Manager provides several views for managing and monitoring individual Fibre Channel devices, including the **Hardware**, **Node List**, **Port List**, **Performance**, and **FRU List** views. Through the Product Manager **Hardware** view, for example, you can determine status and control operation of individual hardware components.

Through a Product Manager, you can perform the following tasks for the product:

- Configure the device name, location, description, and contact person that is displayed in application panels and dialog boxes.
- Monitor operational status of the product and its hardware components.
- Control fiber optic port operation.
- Determine port performance.
- Control the system error indicator light emitting diode (LED) and beaconing operation for other product LEDs.
- Enable an initial program load (IPL).

- Download firmware.
- Perform other configuration and monitoring tasks specific to the product.

**NOTE:** A maximum of eight remote users (in addition to the local HAFM server user) can concurrently access Product Managers for a specific product.

The HAFM window is still available as a separate window when a Product Manager is open. You can drag the Product Manager window away from the HAFM window and view both on your desktop. You can also minimize each window.

To return to the HAFM, choose **Close** from the **Close** menu in the Product Manager.

Refer to the appropriate Product Manager user guide for your Switch or Director model for information on using the Product Manager.

## Available Tool Bar Options

The following options are enabled on the tool bar at the top of the HAFM window when you select a product in the view to select it. For information on tool bar options that are not enabled, refer to [Tool Bar on page 2-3](#).

- **New Product** — This performs the same function as the **New** option in the view pop-up menu by adding a managed product to the HAFM. Refer to [New on page 4-4](#) for details.
- **Open Product** — This opens the *Product Manager* application for the product. Refer to [Accessing a Product Manager on page 4-7](#) for details.
- **Properties** — This opens the **Properties** dialog box for the product. Refer to [Properties on page 4-6](#) for details.
- **Product Name and Network Address drop-down list** — These options perform the same functions as the **Display Options** available through the view pop-up menu. Refer to [Display Options on page 4-4](#) for details.
- **Show Zoning Library** — This displays the **Zoning Library** dialog box. Refer to [Using the Zoning Library on page 6-11](#) for complete information.

## Available Menu Bar Options

The following options are active only in the **Products** view. For information on other menu options, refer to [Chapter 3, Using the Menu Bar](#).

### Product Menu

**New** — Choose this option to display the **New Product** dialog box. Use this dialog box to identify a product to the HAFM and add its icon to the **Products** view. You can also choose this option from the view pop-up menu by right clicking in the view away from product icons. For details on this option, refer to [New on page 4-4](#) under the view pop-up menu.

**Logout** — Choose this option to log out of the current session, close the HAFM, and close any open Product Managers. The HAFM **Login** dialog box displays.

**Exit** - Choose this option to close the HAFM and any open Product Managers.

### View Menu

**User Sessions** — This displays the User Session table. This table list all the current management sessions, including the name of each user connection, the network address of the user, and the time when the connection was established.

**Arrange Icons** — Use this option to modify the display of product icons in the view.

- **By Name** — Arrange icons alphabetically by product name.
- **By Severity** — (Default). Arrange icons according to the product's operating status. Failed products appear first, followed by products with degraded, then unknown operational status. Within these groupings, icons appear alphabetically by their network address (IP address or DNS host name) or product name, depending on the selected display option.

You can also arrange icons by name and severity by selecting the **Sort** option from the view pop-up menu by right-clicking in the view, away from product icons.

**Enable Fly-Over Display** — When Fly-Over Display is enabled (**View** menu on menu bar), move the cursor over fabric products in the tab's view area to display the product's WWN over the product icon. Moving the cursor over the ISL lines between products displays the actual number of ISLs between the products.

Disable the fly-over display by selecting and removing the check mark by the Enable Fly-Over Display option.

## Using the Fabrics View

This chapter provides information to help you use the **Fabrics** view in the High Availability Fabric Manager window.

### Overview

Access the **Fabrics** view by clicking the **Fabrics** tab on the HAFM window. The left panel of this view is the Fabric Tree, which is the expandable list of fabrics, products in fabrics, and nodes connected to products. The view area for the tab is to the right of the Fabric Tree.

Click the **Topology** and **Zone Set** tabs at the bottom of the view area to change the views. The **Topology** tab (default) is illustrated in [Figure 5–1](#).

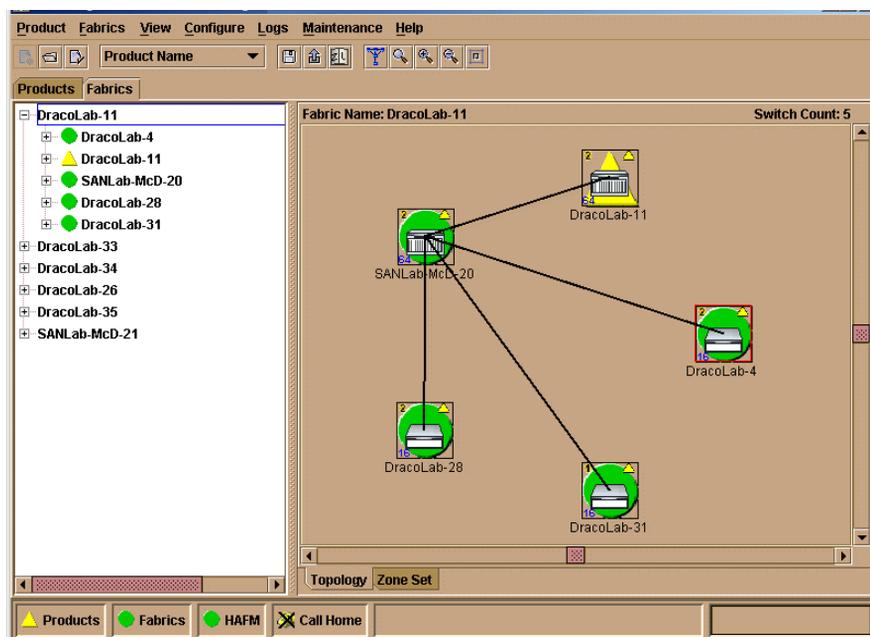


Figure 5–1: Fabrics view — Topology tab

## Topology Tab

The view area of the **Topology** tab provides details on all fabrics known to the HAFM server and *HAFM* application. This area displays product icons like those in the **Products** view, each representing Switches and Directors in fabrics that you select from a Fabric Tree on left panel of the view. Interswitch links (ISLs) display between the product icons as black lines. For details on the product icons, refer to [Icon Description on page 4-2](#). Fabrics are initially listed in the Fabric Tree by the World Wide Name (WWN) of the fabric's principal Switch, but if the fabric is "persisted," they could have various names configured by the user (refer to [Fabric Tree on page 5-3](#) and [Persistent Fabrics on page 5-14](#) for details). The selected fabric's name displays above the icons at the top of the tab.

Refer to [Using the Topology Tab on page 5-4](#) for more details on this tab.

## Zone Set Tab

The **Zone Set** tab is described in [Using the Zone Set Tab on page 5-29](#). This tab displays the currently active zone set for fabrics that you select from the left side of the view. The zones and zone members that make up the zone set display in a scrollable tree structure below the name of the active zone set. Menu options available in this tab allow you to quickly determine fabric zoning structure (zone sets, zones, and zone members), determine logged in and logged out zone members, save active zones under another name, determine the default zone members, deactivate/activate zone sets, and change the default zone.

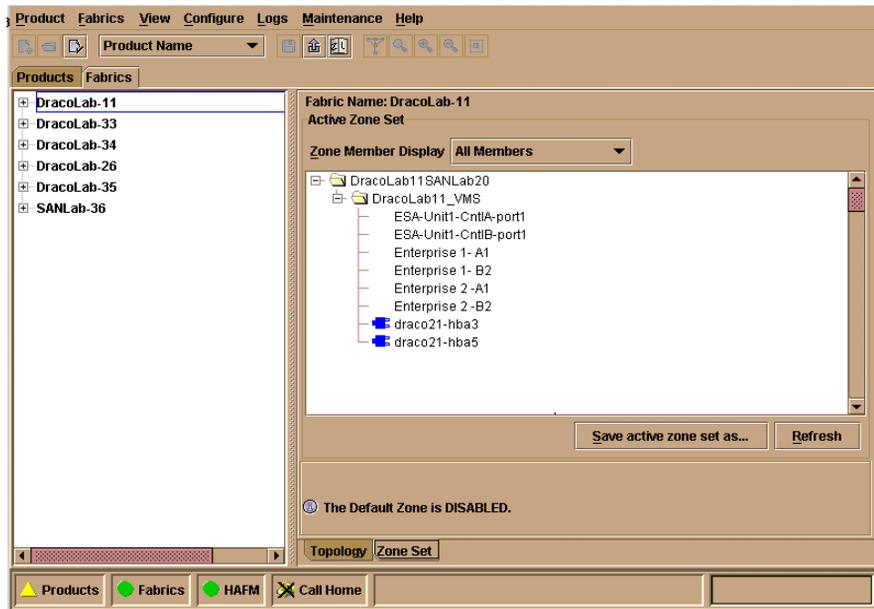


Figure 5–2: Fabrics view — Zone Sets tab

## Fabric Tree

The scrollable panel on the left side of the **Topology** and **Zone Set** tabs contains a list of fabrics that you can select for display of information or to perform actions on in the left panel of the **Topology** and **Zoning** tabs. The tree displays all fabrics currently known to the HAFM server. The outermost leaf displays the fabric name, which initially will be the World Wide Name (WWN) of the fabric’s principal Switch, but if the fabric is “persisted,” it could have a name configured by the user. The name will be preceded by a fabric status icon if the fabric is a persisted fabric. (Refer to [Persistent Fabrics on page 5-14](#) for details).

While viewing the **Topology** tab, click a fabric name or WWN in the Fabric Tree to display the Switches, Directors, and ISLs in the fabric in the view area to the right of the Fabric Tree. If you are viewing the **Zone Set** tab, click a fabric name or WWN to display zoning details about the fabric in the view area to the right of the Fabric Tree.

Click the button to the left of fabric name or WWN to expand the tree and display the WWN or nicknames (if configured) of all products, such as Switches and Directors, included in the fabric. A product status icon will display by each product in the tree (Refer to [Status Icons on page 5-4](#)). If the product is not managed by the HAFM server that you are using, no status icon displays.

Click the button to the left of the product WWN or nickname to display all nodes, such as servers or storage devices, attached to the product. Status is not available for the nodes.

Colored status symbols display before fabric names, if the fabrics are “persisted,” and before product names or product WWNs. Pop-up menus also display when you right-click fabrics, products, and nodes in the Fabric Tree.

Status icons relate to your use of the **Topology** tab. Refer to [Status Icons on page 5-4](#) and [Fabric Pop-Up Menu on page 5-5](#), under the “Using the Topology Tab” section for details.

## Using the Topology Tab

### Fabric Tree

The Fabric Tree on the left side of the **Fabrics** view displays a list of fabrics, products (Switches or Directors) in each fabric, and nodes attached to each product. Click a fabric name or WWN to display the Switches, Directors, and ISLs in the fabric in the **Topology** tab area. Click the icon to the left of a fabric to display the products in the fabric and click the icon by a product to display the nodes attached to the product.

The status icons and pop-up menus that display in the Fabric Tree relate to the display in the **Topology** tab.

### Status Icons

Colored icons reflecting the fabric and product (Switch or Director) operational status display by names and WWNs in the Fabric Tree.

#### Fabric

Colored icons reflecting the fabric status display before a fabric name only if the fabric is “persisted.”

- A blinking red and yellow diamond means that the fabric has split into two or more fabrics.
- A yellow triangle means that all fabric connections are in tact, however attention indicators appear on one or more ISLs in the **Topology** tab for the fabric.
- A green circle means that the fabric is fully operational and no attention indicators appear in an ISL in the **Topology** tab for the fabric.
- A gray square means that no information can be determined for the fabric.

## Product

Colored icons reflecting the product status display before each Switch or Director at all times.

- A blinking red and yellow diamond means that the product has failed and requires immediate service.
- A yellow triangle means that the product is degraded, but is still performing as designed.
- A green circle means that the product is fully operational.
- A gray square means that the HAFM cannot determine product status.

If a status icon does not display behind the product, the product is not managed by the HAFM server to which you are logged in.

## Fabric Pop-Up Menu

Right-click a fabric name or WWN in the Fabric Tree to display a pop-up menu of options.

### Rename

This option is available only if the fabric is persisted. Choose this option to display the **Rename Fabric** dialog box. Enter a name in the dialog box to display in the Fabric Tree and at the top of the **Topology** and **Zone Set** tabs.

### Persist Fabric Topology

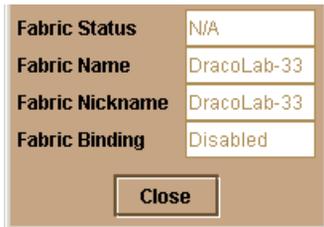
Choose this option to display the **Persist Fabric** dialog box. Enter a name for the fabric and click **OK** to “persist” the fabric. This saves a snapshot of the fabric’s current configuration (Switches, Directors, and ISLs) that displays in the **Topology** tab. Visual indicators display in the **Topology** tab as products and ISLs are deleted or added to help you monitor the fabric’s status over time. This also creates a Fabric Log (available from the Logs menu on the menu bar) that tracks changes to the fabric over time. For details, refer to [Persistent Fabrics on page 5-14](#).

## Unpersist Fabric Topology

This option displays only if a fabric has been persisted. Choosing this option will display a warning that the fabric log will be lost if the fabric is unpersisted. Click **Yes** to unpersist the fabric and the current view of the fabric displays in the tab's view area without the fabric status indicators. The name of the fabric in the Fabric Tree changes back to the fabric's WWN. A fabric status icon will no longer appear by the WWN.

## Properties

Displays the **Fabric Properties** dialog box.



**Figure 5–3: Fabric Properties dialog box**

This dialog box displays current information on the selected fabric including:

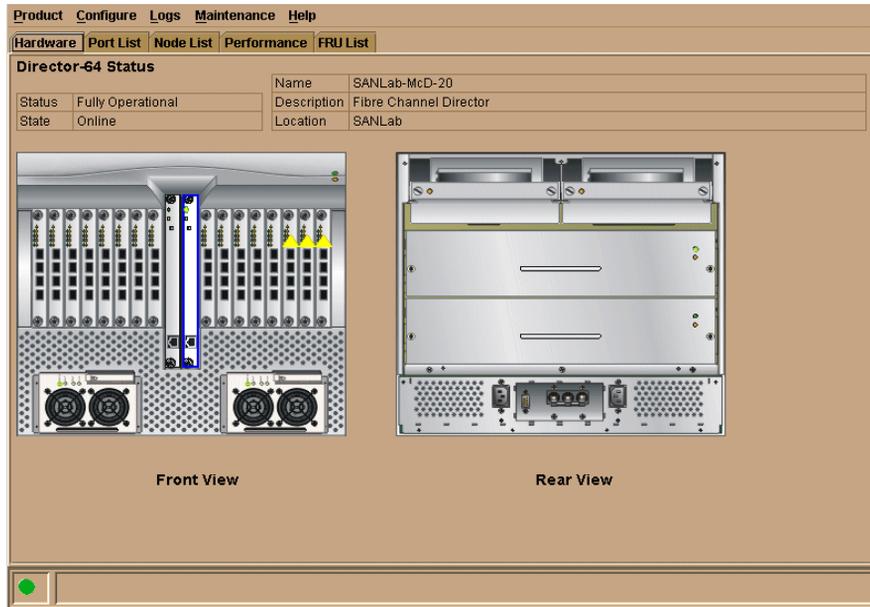
- **Fabric Status** — For persisted fabrics only, this is the status also reflected by the status symbol by fabric name in the Fabric Tree. Refer to the “Fabric” heading under [Status Icons on page 5-4](#) for details.
- **Fabric Name** — This is the name assigned to the principal Switch in the fabric, if configured through the **Configure Nicknames** dialog box. If the fabric is persisted, this is the name assigned in the **Persist Fabric** dialog box.
- **Fabric Nickname** — This is the nickname of the fabric's principal Switch if assigned through the **Configure Nicknames** dialog box.
- **Fabric Binding** — This field identifies whether or not Fabric Binding is enabled or disabled for the selected fabric. For more information about Fabric Binding, see [SANtegrity Features on page 8-6](#).

## Product Pop-Up Menu

Right-click a product WWN or name (if configured through the **Configure Nicknames** dialog box) to display a pop-up menu of options.

### Open

Click this to open the Product Manager for the selected product ([Figure 5-4](#)).



**Figure 5-4: Director 2/64 Product Manager window**

The Product Manager provides several views for managing and monitoring individual Fibre Channel devices, including the **Hardware**, **Node List**, **Port List**, **Performance**, and **FRU List** views. Through the Product Manager **Hardware** view, for example, you can determine status and control operation of individual hardware components.

Through a Product Manager, you can perform the following tasks for the product:

- Configure the device name, location, description, and contact person information that displays in application panels and dialog boxes.
- Monitor operational status of the product and its hardware components.
- Control fiber optic port operation.
- Determine port performance.

- Control the system error indicator light emitting diode (LED) and beaconing operation for other product LEDs.
- Enable an initial program load (IPL).
- Download firmware.
- Perform other configuration and monitoring tasks specific to the product.

**NOTE:** A maximum of eight remote users (in addition to the local HAFM server user) can concurrently access Product Managers for a specific product.

The HAFM window is still available as a separate window when a Product Manager is open. You can drag the Product Manager window away from the HAFM window and view both on your desktop. You can also minimize each window.

To return to the HAFM, choose **Close** from the **Product** menu in the Product Manager.

Refer to the Product Manager user guide for your Switch or Director for information on using the Product Manager.

### **Center in Topology**

Click this option to center the product and surrounding portion of the fabric in the view area.

### **Properties**

Click to display the **Properties** dialog box for the product. Refer to [Properties on page 4-6](#) for more information.

## Node Pop-Up Menu

Right-click a node's WWN or name (if configured through the **Configure Nicknames** dialog box) to display a pop-up menu of options.

### Properties

Click to display the **Node Properties** dialog box.



Port WWN:	Emulex-20:0B:00:00:C9:00:00:00
Port Number:	11
<input type="button" value="Close"/>	

**Figure 5–5: Node Properties dialog box**

This dialog box contains the following information:

- Port WWN  
World Wide Name of port on the attached device.
- Port Number  
The physical port number on the product to which the node is connected.

### Show Route

Click to display the **Show Route** dialog box with the selected node listed in the **Select Source Node** field. Use this dialog box to view the path that Fibre Channel frames must take between two end devices in a multiswitch fabric. This option is also available under the **Fabrics** menu on the menu bar. For details, refer to [Show Route on page 5-20](#).

### Nickname

Click to display the **Configure Nicknames** dialog box. Use this dialog box to add, modify, or delete nicknames for a Director, Switch, or attached node's WWN. For example, you might assign the nickname Director 1 to a Director instead of using the 8-byte WWN. This nickname will be used throughout the HAFM and Product Manager instead of the WWN.

The dialog box displays a list of product and node WWNs in the left panel and the assigned nicknames in the right panel. Use the New button to assign new nicknames for WWNs; use the **Delete** button to delete nicknames. Modify the nickname by clicking by the nickname in the dialog box and changing the name. For details on using this dialog box, refer [Nicknames on page 3-14](#).

## Show Zone Members

Click to display the **Show Zone Members** dialog box. This dialog box displays a tree of all products in the fabric in the left panel. Click an icon by a product to expand the list of attached nodes. Select a node and the WWNs or nicknames (if configured) of nodes that are members of the same zone as the selected node display in the right panel. Refer to [Chapter 6](#) for details on zoning and zoning configuration.

## Topology View Area

Click a fabric WWN (this is the WWN of the fabrics principal Switch) or the fabric name (persisted fabrics only) in the Fabric Tree to display the products and ISL connections included the multiswitch fabric in the **Topology** tab view area. By default, only the products (Switches and Directors) in the fabric display. For details on the product icons, refer to [Icon Description on page 4-2](#).

In multiswitch fabrics (fabrics consisting of two or more Switches), interswitch links (ISLs) between each product are represented by a solid black line. If more than one ISL exists between Switches, the line is thicker. Menu options, available when you right-click icons, ISLs, and the view area of this tab, allow you to determine status of Switches and ISLs, display fabric properties, adjust the fabric display in the tab, show routes between nodes in the fabric, determine fabric changes over time by creating persistent fabrics, open Product Managers for specific Switches, and perform other tasks. For details on these options, refer to [Available Menu Bar Options on page 5-17](#).

## Fly-Over Display

When Fly-Over Display is enabled (**View** menu on menu bar), move the cursor over fabric products in the tab's view area to display the product's WWN over the product icon. Moving the cursor over the ISL lines between products displays the actual number of ISLs between the products.

Disable the fly-over display by selecting and removing the check mark by the Enable Fly-Over Display option.

## Pop-Up Menus

Right Click a product icon, ISL, or blank area in the view area to display a menu of options.

## Product Icon

Right-click a product icon in the **Topology** view area to display the following menu options:

- **Open.** Click to open the *Product Manager* application for the product. You can also choose this option from the product pop-up menu by right-clicking a product name in the Fabric Tree. Refer to [Open on page 5-7](#) for more details on this option.
- **Center in Topology.** Choose a product icon in the tab's view area and click this option to center the product and surrounding portion of the fabric in the view area. Selecting this option without selecting an icon centers the entire fabric in the view area.
- **Properties.** Click to display the **Properties** dialog box for the product. Refer to [Properties on page 4-6](#) for more information.

## ISL

Right-click an ISL line between products in the **Topology** view area to display the following menu options:

- **Clear ISL Alert.** Click to clear all alerts for the ISL. Note that if the ISL does not have an alert, the **Alert** column is blank. An alert only occurs in persisted fabrics when an ISL is removed from the fabric. You can also clear an ISL alert by selecting the ISL and clicking **Clear ISL Alert** from the **View** menu on the menu bar. Clear all ISL alerts in the view by choosing **Clear All ISL Alerts** from the menu bar.
- **Properties.** Displays the **ISL Properties** dialog box. You can also double-click the ISL to display this box. This dialog box displays the domain ID and port number for both products where the ISL is attached. The **Alert** column indicates whether ISLs were added or deleted. Note that ISL alerts only occur if the fabric is persisted.

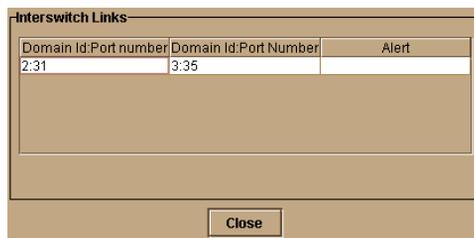


Figure 5-6: ISL Properties dialog box

## View Area

Right-click a blank area in the **Topology** view area, away from an ISL line or product icon, to display the following menu options:

- **Clear All ISL Alerts.** Click to clear all ISL alerts (yellow triangles) from the view of the persisted fabric.
- **Display Options.** Click to display a secondary menu that allows you to change the label under the product icons.
  - **Product Name.** The name of the product configured through the **Configure Identification** dialog box in the Product Manager.
  - **Network Address.** The internet protocol (IP) address or DNS host name of product.
  - **World Wide Name.** Displays the products 8-byte WWN.
  - **Domain ID.** The product’s domain identification number (1-31) assigned by the fabric.
  - **Nickname.** The nickname, if configured through the **Configure Nicknames** dialog box (**Configure** menu on menu bar). If the nickname is not configured, the WWN displays instead.
- **Persist Fabric Topology.** This persists the currently selected fabric. If the fabric was not persisted previously, this option displays the **Persist Fabric** dialog box, where you can provide a name for the persisted fabric. A persisted fabric is a “snapshot” of the current fabric. When the fabric configuration of ISLs and products change from this snapshot, status indicators display in the tab view, and entries on fabric changes appear in the Fabric Log. For details, refer to [Persistent Fabrics on page 5-14](#).
- **Unpersist Fabric Topology.** This option only displays if a fabric has been persisted. Clicking will display a warning that the fabric log will be lost if the fabric is unpersisted. Click **Yes** to unpersist the fabric and the current view of the fabric displays in the tab’s view area without the fabric status indicators. The name of the fabric in the Fabric Tree changes back to the fabric’s WWN. A fabric status icon will not appear by the WWN.
- **Properties.** Click to display the **Properties** dialog box for the product. Refer to [Properties on page 4-6](#) for more information.

## Adjusting the Fabric Display

You can manipulate the fabric in the tab's view area for a better display, especially of larger fabrics by clicking and dragging the fabric in the view area, using menu options, and using options on the tool bar at the top of the HAFM window. You can use these methods to adjust the view:

- Click and drag product icons in the tabs view area. Clicking and dragging one icon drags that icon and changes the length of the ISL line. Move larger sections of the fabric by selecting more than one icon then clicking and dragging one of the selected icons. Select multiple icons by holding the left mouse key and dragging a box around them or using the holding the **Ctrl** button and clicking on each icon.
- Right-click a product icon, then choose **Center in Topology** from the pop-up menu to center the product and surrounding portion of the fabric in the view. Choosing this option without selecting an icon centers the entire fabric in the view.
- Click and drag the border separating the Fabric Tree and the view area to widen the view area. Eliminate the Fabric Tree entirely from the tab by selecting and removing the check mark by Show Fabric Tree on the **Fabrics** menu on the menu bar.
- Click the **Layout Icons, Show View Port, Zoom In, Zoom Out, and Fit Topology Into View** buttons on the right side of the tool bar at the top of the HAFM window. These options manipulate the fabric in the view area and are also available under the **View** menu on the menu bar.
- Use the horizontal and vertical scroll bars on the edges of the view area.
- Use view port which provides a magnified view of the entire fabric where you can adjust your view of the fabric in the tab's view area. Access view port by clicking the **View Port** button on the tool bar or by choosing **Fabrics > Show View Port**. Click inside the view port and move the mouse in any direction to adjust what you see in the tab's view area.
- Use options from the **View** menu on the menu bar.
  - Choose the **In** and **Out** options from the **Zoom** menu to increase and decrease the size of fabric elements. Return to the original view by choosing the **Default** option.

- Choose the **Fit In View** option to display the entire fabric in the view area. Note that for larger fabrics, text and icons may be difficult to see. Choose **Default** from the **Zoom** menu to return to the original view or use the **Out** option to selectively reduce the view.
- Choose the **Spring** option from the **Layout Icons** menu to shorten the length of the ISLs in the view area and “spring” in the product icons closer together. Click the **Circular** option to display the fabric in the more spread out, circular layout.

## Persistent Fabrics

The **Persist Fabric Topology** menu option is available through the **Fabrics** menu on the menu bar, the **Persist Fabric Topology** button on the tool bar, the right-click fabric pop-up menu in the Fabric Tree, and the right-click view pop-up menu in the **Topology** view area.

Click this option to take a “snapshot” of the current Switches, Directors, and ISL connections in the fabric. Choosing this option displays the **Persist Fabric** dialog box where you must enter a name for the “persisted” fabric. This name then displays in place of the fabric’s WWN in the Fabric Tree panel and at the top of the tab’s view area.

This snapshot will persist in the **Topology** view and real-time changes to the fabric will be reflected by graphic indicators such as alert indicators (yellow triangles), dimmed product icons, and dashed yellow lines as shown in [Figure 5-7](#). You can persist a fabric whenever you want to refresh the view to the current fabric state and track changes from the new persisted view.

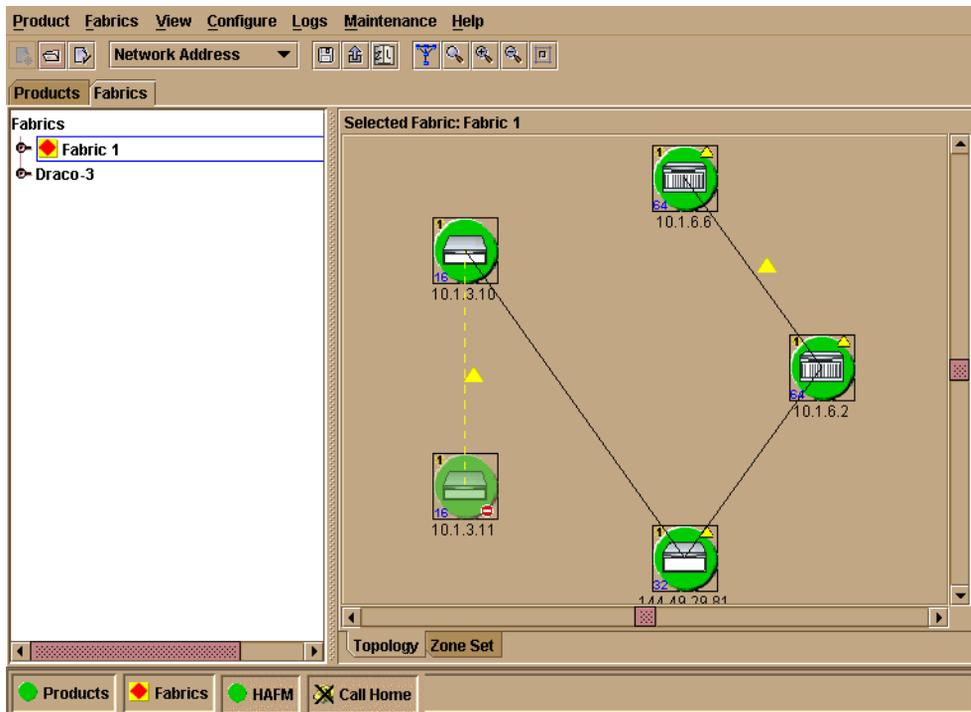


Figure 5–7: Persisted fabric in Topology view

## Graphic Indicators in View

Changes to a persisted fabric are indicated in the **Topology** view area as the following:

- If a Switch or Director is removed from or added to the fabric, the product displays in a dimmed state and ISL(s) that connected the product to the fabric will appear as dashed yellow lines.
  - A minus sign (-) displays in the lower right corner of the product's icon if the Switch or Director was removed.
  - A plus sign (+) displays in the lower right corner of the product's icon if the Switch or Director was added.
- If more than one ISL is connected to a product and all ISLs are disconnected, the ISLs change to a yellow, dashed lines with alert indicators (yellow triangles). If one or some of the ISLs are disconnected (but not all), the disconnected ISLs will appear as black lines with alert indicators (yellow triangles).

- If an ISL is added, the ISL displays as a black line with an alert indicator (yellow triangle).

If you persist the fabric again, a product displays in the view if added and disappears from the view if removed. Added ISL lines remain in black and yellow-dashed ISL lines disappear. All alert indicators also disappear.

- Clear an ISL alert by clicking the ISL and choosing **Clear ISL Alert** from the pop-up menu. You can also clear an ISL alert by selecting the ISL and clicking **Clear ISL Alert** from the **View** menu on the menu bar.
- You can clear all ISL alert indicators by right-clicking on the **Topology** tab's view area, away from a fabric element, and choosing **Clear ISL Alert** from the pop-up menu. You can also clear all ISL alerts in the view by choosing **Clear All ISL Alerts** from the **View** menu on the menu bar.

## Fabric Log

Changes to the fabric are reflected in the Fabric Log (**Logs** menu on menu bar).

This log tracks the following changes:

- Zone sets becoming active.
- Switch added/removed.
- ISL added/removed.
- Fabric renamed.
- Fabric persisted.
- Fabric status changes.

The following is recorded in the log:

- Date and time of the change.
- Change in the fabric status:
  - Operational — no attention indicators in view.
  - Degraded — All fabric connections are intact, however one or more ISLs have attention indicators.

- Failed — Fabric has split into two or more fabrics.
- Unknown — No information is known about the fabric.

Note that this status is also reflected by colored icons by the fabric name in the Fabric Tree (refer to [Status Icons on page 5-4](#)).

- Description of the change.

**NOTE:** Unpersisting the fabric will remove all data from the Fabric Log.

## Unpersisting Fabrics

You can unpersist a fabric by choosing **Fabric > Unpersist Fabric Topology**, the right-click fabric pop-up menu in the Fabric Tree, or the right-click view pop-up menu in the **Topology** view area.

Choosing this option displays a warning that the fabric log will be lost if the fabric is unpersisted. Click **Yes** to unpersist the fabric and the current view of the fabric displays in the tab's view area without the fabric status indicators. The name of the fabric in the Fabric Tree changes back to the fabric's WWN. A fabric status icon will not appear by the WWN.

## Available Menu Bar Options

This section provides detail on the options that are active in the **Product**, **Fabrics**, **View**, and **Configure** menus on the menu bar when you are using the **Topology** tab. For information on other menu options, refer to [Chapter 3, Using the Menu Bar](#).

### Product

Choose the **Product** menu on the menu bar to display the following options:

#### Open

Click this to open the Product Manager for the product. Also open a product through the right-click product pop-up menu in the Fabric Tree. Refer to [Open on page 5-7](#) for more information.

#### Properties

Click this to display a **Properties** dialog box for elements selected in the **Topology** tab view area. If a product is selected, the **Properties** dialog box for the Switch or Director displays (refer to [Properties on page 4-6](#).) If nothing is selected, the **Properties** dialog box for the fabric displays (refer to [Properties on page 5-6](#)).

## Logout

Click this to log out of the current session, close the HAFM, and close any open Product Managers. The HAFM **Login** dialog box displays and allows you to log in to another HAFM server.

## Exit

Exits the *HAFM* application.

## Fabrics

Choose the **Fabrics** menu on the menu bar to display the following options.

### Rename

This option is only active if a fabric is persisted. Click this to display the **Rename Fabric** dialog box. Enter a new name to change the name displayed in the **Fabrics** view.

### Persist Fabric Topology

This persists the currently selected fabric. If the fabric was not persisted previously, this option displays the **Persist Fabric** dialog box, where you can provide a name for the persisted fabric. A persisted fabric is a “snapshot” of the current fabric. When the fabric configuration of ISLs and products changes from this snapshot, status indicators display in the tab view and entries on fabric changes appear in the Fabric Log. For details, refer to [Persistent Fabrics on page 5-14](#).

### Unpersist Fabric Topology

This option is only enabled if a fabric has been persisted. Selecting this option will display a warning that the fabric log will be lost if the fabric is unpersisted. Click **Yes** to unpersist the fabric and the current view of the fabric displays in the tab’s view area without the fabric status indicators. The name of the fabric in the Fabric Tree changes back to the fabric’s WWN. A fabric status icon will no longer appear by the WWN.

### Export Fabric Topology

Click to display the **Export Fabric Topology** dialog box. Use this dialog box to create an .xml file containing fabric topology information and an associated Fabric Topology .dtd file. The .dtd file is required for reading the .xml file in browsers.

Enter a name in the dialog box for the .xml file in the **File Name** field, select a folder on your C: drive or network drive where you want to save the file, then click **Save**.

You can open this file and read its contents using any ASCII editor, such as Notepad. Information is grouped under the WWN of each fabric member (Switch or Director). Information includes:

- WWN and domain ID of the Switch or Director.
- Output port on the Switch or Director where an ISL is attached.
- Link identification number for the ISL.
- Port number on the remote Switch or Director where the ISL is attached.

An example of an exported file follows.

### **.XML File Example**

Following is a partial exported file showing two members in a fabric.

```
<FabricTopology FabricWWN="McDATA-10:00:08:00:88:00:21:00">
  <FabricMember WWN="McDATA-10:00:08:00:88:00:21:00" DomainId="1">
    <FabricMemberConnection OutputPort="16" RemotePort="4"
LinkId="11"/>
    <FabricMemberConnection OutputPort="4" RemotePort="12"
LinkId="2"/>
    <FabricMemberConnection OutputPort="24" RemotePort="8"
LinkId="12"/>
    <FabricMemberConnection OutputPort="28" RemotePort="4"
LinkId="3"/>
    <FabricMemberConnection OutputPort="8" RemotePort="8"
LinkId="4"/>
    <FabricMemberConnection OutputPort="20" RemotePort="4"
LinkId="5"/>
    <FabricMemberConnection OutputPort="12" RemotePort="20"
LinkId="6"/>
    <FabricMemberConnection OutputPort="44" RemotePort="0"
LinkId="7"/>
    <FabricMemberConnection OutputPort="0" RemotePort="0"
LinkId="8"/>
    <FabricMemberConnection OutputPort="36" RemotePort="4"
LinkId="9"/>
    <FabricMemberConnection OutputPort="32" RemotePort="0"
LinkId="10"/>
    <FabricMemberConnection OutputPort="52" RemotePort="4"
LinkId="19"/>
  </FabricMember>
</FabricTopology>
```

```
<FabricMemberConnection OutputPort="48" RemotePort="4"
LinkId="20"/>
</FabricMember>
<FabricMember WWN="10:00:08:00:88:00:21:0A" DomainId="11">
  <FabricMemberConnection OutputPort="4" RemotePort="16"
LinkId="1"/>
  <FabricMemberConnection OutputPort="0" RemotePort="24"
LinkId="12"/>
  <FabricMemberConnection OutputPort="20" RemotePort="8"
LinkId="2"/>
  <FabricMemberConnection OutputPort="12" RemotePort="12"
LinkId="21"/>
  <FabricMemberConnection OutputPort="8" RemotePort="12"
LinkId="22"/>
  <FabricMemberConnection OutputPort="28" RemotePort="4"
LinkId="23"/>
  <FabricMemberConnection OutputPort="24" RemotePort="8"
LinkId="24"/>
  <FabricMemberConnection OutputPort="32" RemotePort="4"
LinkId="13"/>
  <FabricMemberConnection OutputPort="36" RemotePort="8"
LinkId="14"/>
  <FabricMemberConnection OutputPort="40" RemotePort="4"
LinkId="15"/>
  <FabricMemberConnection OutputPort="44" RemotePort="16"
LinkId="16"/>
  <FabricMemberConnection OutputPort="48" RemotePort="4"
LinkId="17"/>
  <FabricMemberConnection OutputPort="56" RemotePort="8"
LinkId="18"/>
```

## Show Route

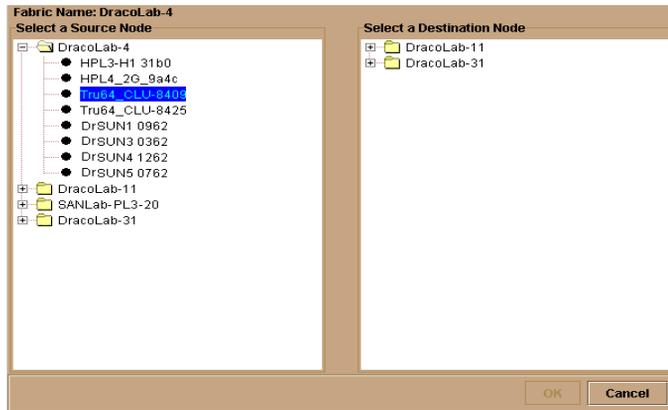
Click to display the **Show Route** dialog box. Use this dialog box to view the path that Fibre Channel frames will take between two end devices in a multiswitch fabric. You can also display this dialog box by right-clicking on a node in the Fabric Tree and choosing **Show Route** from the pop-up menu.

To view the route between two devices, the following must be true:

- All Switches or Directors in the route must be managed by HAFM and attached to the same HAFM server.

- All Switches or Directors in the route must be Director 2/140, Director 2/64, Edge Switch 2/32, Edge Switch 2/24, Edge Switch 2/16, or other models that support **Show Route** and must be running firmware version 1.3 or higher.
- All attached devices in the route must be in the same zone.

The **Show Route** dialog box (Figure 5–8) displays products (Switches and Directors) that support route reporting and are managed by this HAFM server in the **Select Source Node** panel.



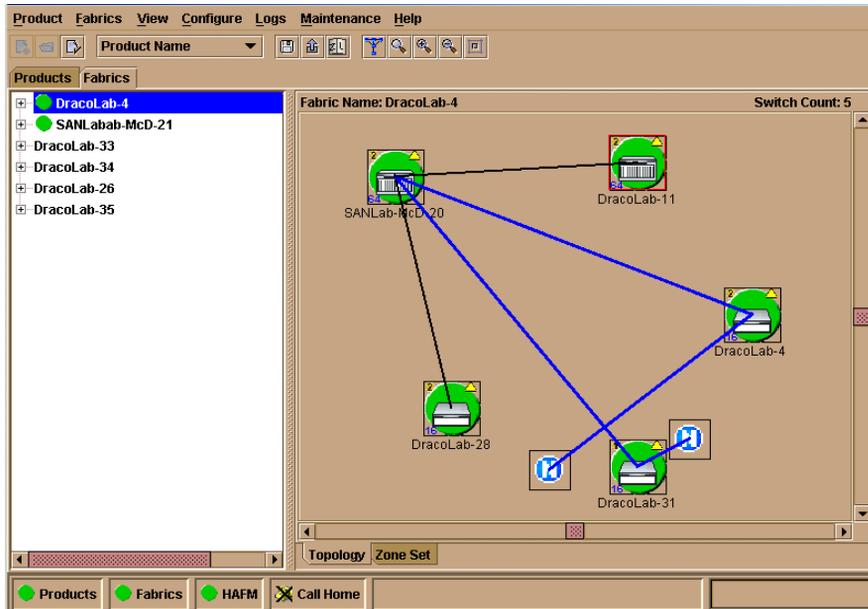
**Figure 5–8: Show Route dialog box**

To show the route for two specific nodes, perform the following steps:

1. Click the icon by a product in the **Select Source Node** panel to expand the list of nodes attached to the product.
2. Click a source node to select it.
3. A list of products displays in the **Select Destination Node** panel.
4. Click the icon by a product in the **Select Destination Node** panel to expand the list of nodes attached to the product.
5. Click a destination node to select it.
6. Click **OK**.

The route between the destination nodes (indicated by a small circle with an N in the center) displays in the **Topology** tab's view area (Figure 5–9 on page 5-22).

The route continues to be displayed until there is a change to the fabric, the route is changed, or the hide route option is selected.



**Figure 5–9: Route displayed in Topology tab**

The route between the nodes and through the products display as a thick blue line between two node icons. Right click the line to display the following menu options:

- **Hide Route.** Click to remove the route from the display.
- **Properties.** Click to display a dialog box that details route information. This dialog box contains the following information:
  - WWN or nickname of source node. This depends on the setting for the **Display Options** (right-click menu on **Topology** tab’s view area).
  - WWN or nickname of destination node. This depends on the setting for the **Display Options** (right-click menu on **Topology** tab’s view area).
  - The in ports and out ports on the Switches and Directors where the route passes.

## Hide Route

This option is only active if the tab’s view area is displaying a route between nodes in the fabric. Click this option to remove the route from the display that was enabled with the **Show Route** menu option.

## Show Zone Members

Click to display the **Show Zone Members** dialog box. This dialog box displays a tree of all products in the fabric in the left panel. Click an icon by a product to expand the list of attached nodes. Select a node and the WWNs or nicknames (if configured) of nodes that are members of the same zone as the selected node display in the right panel. Refer to [Chapter 6](#) for details on zoning and zoning configuration.

## Show View Port

Click the check box to display the **View Port** secondary window. Click inside the window and move the mouse to adjust the view of the fabric in the tab's view area.

Clear the check box to remove the **View Port** window from the screen.

## Show Fabric Tree

Select the check box to display the Fabric Tree on the left side of the **Fabrics** tab.

Clear the check box to remove the Fabric Tree from the left side of the **Fabrics** tab.

## Enterprise Fabric Mode

This option is only available if the SANtegrity feature is installed on each Switch in the fabric. Click to display the **Enterprise Fabric Mode** dialog box. Use this dialog box to enable and disable Enterprise Fabric Mode. Enabling this mode automatically enables SANtegrity fabric and Switch binding, as well as the rerouting delay, domain RSCNs, and insistent domain ID parameters for each Switch in the fabric. For details on using this option, refer to [Enterprise Fabric Mode on page 8-12](#).

## Fabric Binding

This option is only available if SANtegrity features are installed on each Switch in the fabric. Click to display the **Fabric Binding** dialog box. Use this dialog box to enable and disable Fabric Binding and add Switches and Directors to the **Fabric Binding Membership List**. Switches in this list are allowed to connect to the fabric. For details on using this option, refer to [Fabric Binding on page 8-6](#).

## View

Choose the **View** menu on the menu bar to display the following options:

### User Sessions

Click this to display the **User Sessions** dialog box. This lists sessions with the HAFM server from remote workstations. The dialog box lists user names, remote workstation address, and the date/times that users established a connection. For details, refer [Chapter 3, Using the Menu Bar](#).

### Zoom

- **In.** Each time that you click this option, fabric elements in the view area increase in size. Return to the original view by selecting the **Default** option.
- **Out.** Each time that you click this option, fabric elements in the view area decrease in size. Return to the original view by selecting the **Default** option.
- **Fit In View.** This displays the entire fabric in the view area. This enlarges elements of smaller fabrics and reduces elements of large fabrics. Note that for larger fabrics, text and icons may be difficult to see.
- **Default.** Click to return to the original view.

### Layout Icons

- **Spring.** Click to shorten the length of the ISLs in the view area and “spring” the product icons closer together.
- **Circular.** Click to display the fabric in the more spread out, circular layout.

### Center in Topology

Select a product icon in the tab’s view area and click this option to center the product and surrounding portion of the fabric in the view area. Selecting this option without selecting an icon centers the entire fabric in the view area.

### Clear ISL Alert

This option is only enabled if you have persisted a fabric. You can clear an ISL alert on a specific ISL by clicking the ISL and selecting this option.

### Clear All ISL Alerts

This option is only enabled if you have persisted a fabric. Selecting this will clear all ISL alerts in the view.

## Enable Fly Over Display

Enable the fly-over display of product identification and the number of ISLs between products when you move the cursor over elements in the view area by selecting the check box.

Disable the fly-over display by clearing the check mark.

## Configure

Choose the **Configure** menu on the menu bar to display the following options:

### Users

Opens the **Configure Users** dialog box that allows you to administer HAFM users. For details, refer to [Users on page 3-8](#).

### Nicknames

Opens the **Configure Nicknames** dialog box that allows you to provide nicknames for product and node WWNs. For details, refer to [Nicknames on page 3-14](#).

### Sessions

Opens the **Configure Sessions** dialog box that allows you to configure remote access to the HAFM server from remote management stations. You can allow access from all management stations, restrict access to those stations with specific network addresses, or restrict access from all stations. You can also set the maximum allowed sessions from one to eight. For details, refer to [Sessions on page 3-17](#).

### SNMP Agent

Opens the **Configure SNMP** dialog box that allows you to configure the SNMP agent that runs on the HAFM server and implements the Fibre Alliance MIB.

The HAFM server software contains a simple network management protocol (SNMP) agent component. The HAFM SNMP agent instruments the objects defined in the Fibre Channel Management (FCMGMT) Management Information Base (MIB) Version 2.2 and a small number of objects defined in MIB II. Through instrumentation of these MIB objects, the agent acts as a translator of information stored on the HAFM server and attached Directors into a form usable by SNMP management stations such as HP OpenView. Refer to the *hp StorageWorks SNMP reference guide for directors and edge switches*.

You can configure network addresses and community names for up to twelve SNMP trap recipients, which receive messages through SNMP for specific events that occur on the HAFM server.

When configuring SNMP, you can configure just the community names of valid SNMP management stations.

For details on using the **Configure SNMP** dialog box, refer to [SNMP Agent on page 3-19](#).

## Activate Zone Set

Opens the **Activate Zone Set** dialog box that allows you to select and activate configured zone sets. Only one zone set in the fabric can be active at one time. Activating a zone set replaces the current active zone set with the one you activate.

The dialog box displays all zone sets currently configured for the fabric. You can click **Next** to display additional screens that help you through the activation process or **Previous** to view previous screens. Refer to [Activate Zone Sets on page 6-26](#) for details on zoning and use of this dialog box.

## Zoning Library

Opens the **Zoning Library** dialog box. Use this dialog box to perform the major tasks for configuring zoning on the fabric:

- Configure zone sets by combining zone members (attached nodes)
- Configure zone sets by combining zones
- Clear zones
- Delete zones and zone sets
- Import and export zone sets
- Display zone and zone set properties
- Copy zones and zone sets
- Find zone members in zones
- Find zones in zone sets
- Display zone sets, zones, and zone members in library

Refer to [Using the Zoning Library on page 6-11](#) for details on zoning and use of this dialog box.

## Advanced Zoning

Choose this option to open a secondary menu with the following options:

- **Deactivate Zone Set.** Click this option to display the **Deactivate Zone Set** dialog box. Use this dialog box to deactivate the current active zone set. Click **Start** to begin the process, and messages display to indicate deactivation status. When the **Close** button displays, you can close the dialog box. Refer to [Default Zone on page 6-7](#) for details on zoning and use of this dialog box.
- **Configure Default Zone.** Click this option to display the **Configure Default Zone** dialog box. Use this dialog box to enable and disable the default zone. Click **Start** to begin the process, and messages display to indicate process status. When the **Close** button displays, you can close the dialog box. Refer to [Default Zone on page 6-7](#) for details on zoning and use of this dialog box.

## Active Tool Bar Options

Certain options on the tool bar are active in the **Topology** tab to provide quick access to frequently-used options that are also in tab menus. For information on other tool bar options, refer to [Tool Bar on page 2-3](#).

## Open Product

This tool bar option is available only when you select a product in the **Topology** tab view area. Click this to open the Product Manager for the product. Also open a product through the right-click product pop-up menu in the Fabric Tree. Refer to [Open on page 5-7](#) for more information.

## Properties

Click this to display a **Properties** dialog box for elements selected in the **Topology** tab view area. If a product is selected, the **Properties** dialog box for the Switch or Director displays (refer to [Properties on page 4-6](#)). If nothing is selected, the **Properties** dialog box for the fabric displays (refer to [Properties on page 5-6](#)).

## Display Drop-Down Box

Click this drop-down list to change the product label under the product icon in the **Topology** tab's view area. This display can be changed to **Product Name**, **Network Address**, **World Wide Name**, **Domain ID**, **Nickname**. These same options are available under the **Display Option** submenu on the right-click pop-up menu in the tab's view area. Refer to [View Area on page 5-12](#).

## Persist Fabric Topology

Click to persist the current fabric configuration. If the fabric is not persisted already, the **Persist Fabric Topology** dialog box displays so that you can enter a name for the fabric. Refer to [Persistent Fabrics on page 5-14](#).

## Export Fabric Topology

Click to display the **Export Fabric Topology** dialog box. This option is also available under the **Fabrics** menu on the menu bar. For details, refer to [Export Fabric Topology on page 5-18](#).

## Show Zoning Library

Click to display the **Zoning Library** dialog box. This option is also available under the **Configure** menu on the menu bar. For details, refer to [Configuring Zoning through the HAFM on page 6-11](#)

## Layout Icons

Click this to change the fabric layout to the default layout for the view area between circular or spring. This option is also available under the **View** menu on the menu bar. Refer to [Layout Icons on page 5-24](#) for details.

## Show View Port

Opens up the view port window so that you can adjust the display of the fabric in the tab's view area. This option is also available under the **Fabrics** menu on the menu bar.

Click inside the **View Port** window and move the mouse to adjust the view of the fabric in the tab's view area.

## Zoom In

Click this to zoom in and enlarge the view of fabric elements in the view area. This option is also available in the **Zoom** secondary menu under the **View** menu on the menu bar.

## Zoom Out

Click this to zoom out and reduce the view of fabric elements in the view area. This option is also available in the **Zoom** secondary menu under the **View** menu on the menu bar.

## Fit Topology in View

This option is also available in the **Zoom** secondary menu under the **View** menu on the menu bar. This displays the entire fabric in the view area. This enlarges elements of smaller fabrics and reduces elements of large fabrics. Note that for larger fabrics, text and icons may be difficult to see.

## Using the Zone Set Tab

Click the **Zone Set** tab in the **Fabrics** view to open the **Zone Set** tab. Select a fabric in the Fabric Tree on the left side of the tab to display information on the currently active zone set for the fabric in the right view area. Initially, a tree structure of zones and zone members in the active zone set is completely expanded in the display area. An expanded tree of zone members will also display for the default zone if it is currently enabled.

Expand and compress the lists of zones and zone sets in the display area by clicking the icons to the left of the zone and zone set names. You can display all zone members for each zone, only zone members logged in, or only zone members not logged in using the drop-down list above the display area.

## View Area Features

This section describes the buttons, drop-down lists, and messages that display in the view area.

- Click the **Save Active Zone Set As** button to display the **Save Active Zone Set As** dialog box. Enter a name for the zone set and click **OK** to save the active zone set under a different name in the zone set library.
- Click **Refresh** to refresh the display area with current zone set data.
- Right-click in the view area to display the **Display Options** menu. Choose **Nickname** to display zone members by nickname (if configured). Choose **World Wide Name** to display members by their 16-digit WWN.
- The information area at the bottom of the tab will display one of three messages:
  - The Default Zone is ENABLED. If the default zone is enabled, members in the default zone appear in the tree structure of zones and members in the display area.

- The Default Zone is DISABLED. If disabled, members of the default zone will not appear in the tree structure in the display area.
- The active zone set does not currently match any of the stored zone sets. This displays if the active zone set does not match any zone sets in the zoning library.

## Available Menu Bar Options

All menu bar options that are enabled in the menu bar are covered in [Chapter 3, Using the Menu Bar](#) of this guide. You can also show or hide the Fabric Tree on the left side of the tab by clicking the **Show Fabric Tree** check box under the **Fabrics** menu. This expands the view area for displaying the active zone, zones, and members.

## For More Information

For details on configuring zoning, including activating and deactivating zone sets and disabling and enabling the default zone, refer to [Chapter 6](#).

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## Fabric Zoning

This chapter explains how to:

- Zone fabrics
- Use zoning features and dialog boxes

### Zoning Basics

**NOTE:** Designing zoning can be a complex task, especially for multiswitch fabrics. Refer to HP's professional services organization before configuring zoning.

This section is designed to help you understand the following concepts so that you can more efficiently use HAFM features to configure and manage zones across a multiswitch fabric:

- Benefits of zoning.
- How zoning works to control access to storage devices and servers across a fabric.
- Other methods of controlling access at the Switch, server, and device (such as binding).
- Merging zoned fabrics.
- Basic concepts of zoning that you must deal with in configuring zoning such as zones, zone sets, active zones, default zones, and zoning libraries.

### Controlling Access Across a Fabric

The fabric zoning feature enables you to partition devices attached to managed Fibre Channel products into groups called zones. A zone contains devices that can access one another through port-to-port connections. Devices in the same zone can recognize and communicate with one another; devices in different zones cannot.

System administrators create zones to increase security measures and prevent data loss or corruption by controlling access between devices (such as servers and data storage units), or between separate user groups (such as engineering or human resources). Zoning allows an administrator to:

- Establish barriers between devices that use different operating systems. For example, it is often critical to separate servers and storage devices with different operating systems because accidental transfer of information from one to another can delete or corrupt data. Zoning prevents this accidental transfer of information by grouping devices that use the same operating systems into zones.
- Create logical subsets of closed user groups. Administrators can authorize access rights to specific zones for specific user groups, thereby protecting confidential data from unauthorized access.
- Create groups of devices that are separate from devices in the rest of a fabric. Zoning allows certain processes (such as maintenance or testing) to be performed on devices in one group without interrupting devices in other groups.
- Allow temporary access between devices for specific purposes. Administrators can remove zoning restrictions temporarily (for example, to perform nightly data backup), then restore zoning restrictions to return to normal processes.

Figure 6–1 illustrates three zones established on a single managed product with four devices in each zone. Devices in each zone can communicate with and access devices only in their respective zones.

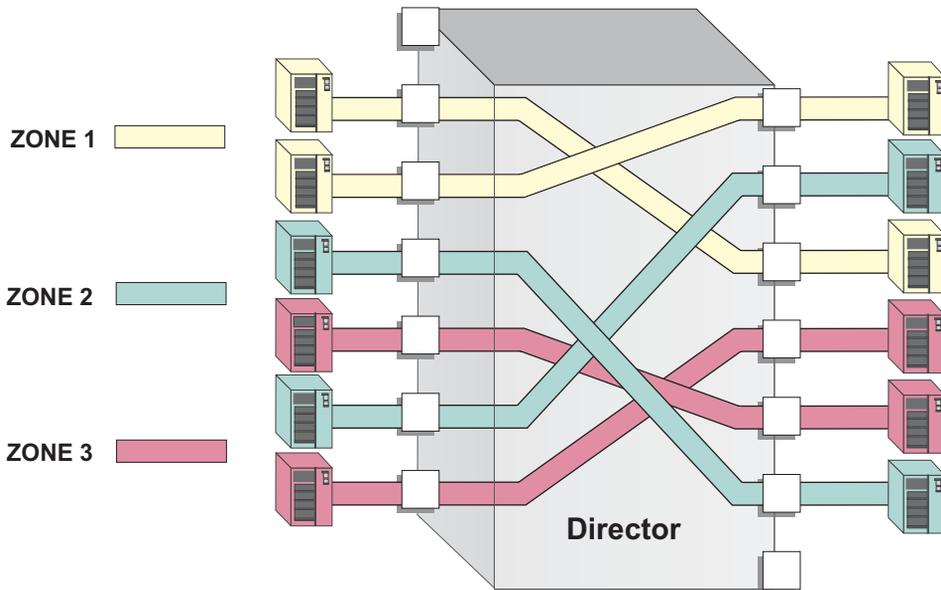


Figure 6–1: Zoning through a single Fibre Channel managed product

Figure 6–2 illustrates how zones can consist of ports and/or devices installed on ports in three managed products in a multiswitch fabric.

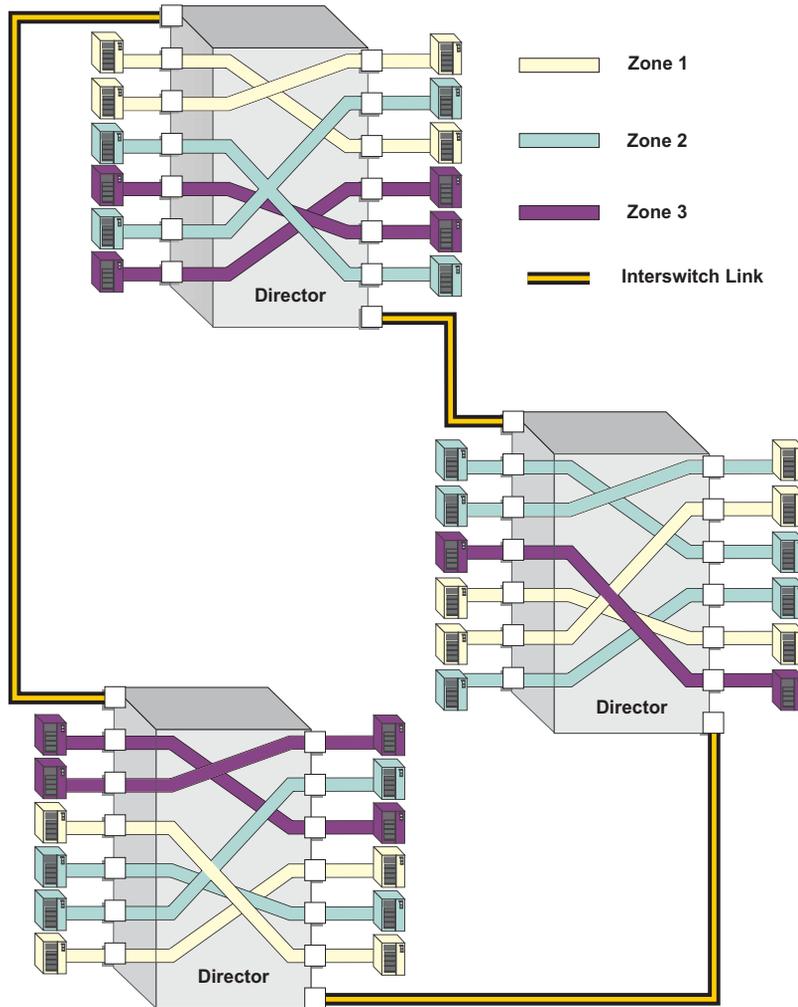


Figure 6–2: Zoning through a multiswitch fabric

## Controlling Access at the Switch

A port binding feature is available on Switches and Directors that allows you to “bind” a specific Switch or Director port to the WWN of an attached device for exclusive communication. This WWN binding feature is available through the **Configure Ports** option in the *Product Manager* application’s **Configure** menu. This feature is also available through the pop-up menu when you right click a port in the **Hardware View**, **Port Card View**, **Port List View**, and **Performance View**.

## Controlling Access at the Server or Storage Device

Features available at the server or storage device can add methods, beyond zoning, to increase network security measures, differentiate between operating systems, and prevent data loss or corruption by controlling access between devices or between separate user groups (such as Engineering or Human Resources).

Server-level access control is called persistent binding. Persistent binding uses configuration information stored on the server and is implemented through the server’s host bus adapter (HBA) driver. The process binds a server device name to a specific Fibre Channel storage volume or logical unit number (LUN), through a specific HBA and storage port WWN. In essence, this feature creates a reliable route across the fabric that sustains the small computer system interface (SCSI) connection between a server and storage device.

For persistent binding:

- Each server HBA is explicitly bound to a storage volume or LUN, and access is explicitly authorized (access is blocked by default).
- The process is compatible with open system interconnection (OSI) standards. The following are transparently supported:
  - Different operating systems and applications.
  - Different storage volume managers and file systems.
  - Different fabric devices, including disk drives, tape drives, and tape libraries.
- If the server is rebooted, the server-to-storage connection is automatically re-established.
- The connection is bound to a storage port WWN. If the fiber optic cable is disconnected from the storage port, the server-to-storage connection is automatically re-established when the port cable is reconnected. The connection is also automatically re-established if the storage port is cabled through a different managed product port.

Access can also be controlled at the storage device as an addition or enhancement to redundant array of independent disks (RAID) controller software. Data access is controlled within the storage device, and server HBA access to each LUN is explicitly limited (access is blocked by default). Storage-level access control:

- Provides control at the storage port and LUN level, and does not require configuration at the server.
- Is typically proprietary and protects only a specific vendor's storage devices. Storage-level access control may not be available for many legacy devices.

**NOTE:** Refer to HP's professional services organization before establishing persistent binding and when establishing access control features at the storage device.

## Zoning Concepts

Zoning is configured by authorizing or restricting access to name server information associated with device ports that attach to product ports. A zone member is specified by the number of the product port to which a device is attached, or by the 8-byte World Wide Name assigned to the host bus adapter or Fibre Channel interface installed in a device. A device port can belong to multiple zones.

Zoning concepts include:

- Zones
- Default Zone
- Zone Sets
- Zone Library
- Active Zone Set

## Naming Conventions for Zones and Zone Sets

The following naming conventions apply to zones and zone sets:

- All names must be unique and may not differ by case only. For example, myzone and MyZone are both valid individually, but they are not considered to be unique.
- The first character of a zone set name must be a letter (A-Z, a-z).
- A zone set name cannot contain spaces.
- Valid characters are a-a, A-A, 0-9, ^, -, \_, and \$.
- A zone set name can have a maximum of 64 characters.

## Zones

A zone comprises a set of members that can access each other. Refer to [Table 6–2 on page 6-12](#) for details on the number of members that you can configure in a zone and the number of zones that you can configure in the HAFM zoning library.

A zone member can be a product port or the WWN of the device. Ports and devices spread throughout multiple managed products in a multiswitch fabric may be grouped into the same zone. Members of a zone can communicate with one another; members in different zones cannot. The number of members that you can configure for a zone varies according to the number of zones in the zone set, the length of the zone names, and other factors, but is essentially bounded by the available nonvolatile random-access memory (NVRAM) in the managed product.

**NOTE:** Port numbers cannot be used for zone members if the interoperability mode for the Switch or Director is set to Open Fabric 1.0 mode. In this case, you must use node WWNs as zone members.

The type of zone members identified for a zone may be mixed and matched. For example, two members may be specified by a port number and the third member by the WWN of the device.

## Using WWNs

To identify a zone member by WWN, use the 16-digit WWN of the device. For example:

```
10:00:08:00:88:40:C0:D4
```

In the HAFM and Product Manager, the WWN is preceded with the Switch or Director manufacturer's name. The WWN is assigned to the Fibre Channel interface or HBA installed in devices such as servers or storage devices. Although the device may also have a node WWN, this WWN is not used for zoning identification. If you have assigned a nickname to the WWN through the **Configure Nicknames** dialog box, that nickname displays when you point to the WWN. In this case, you will assign the nickname as the zone member.

The advantage of identifying a zone member as the WWN of the attached device is that the identification will not change if fiber cable connections to ports are rearranged. This is especially important if you are using spare ports. You can simply move the fiber cable to a spare port from a failed port and still maintain the zoning configuration.

The disadvantage of identifying a zone member by the WWN is that removal and replacement of a device HBA or Fibre Channel interface (thereby changing the device WWN) disrupts zone operation and may incorrectly include or exclude a device from a zone.

## Using Port Numbers

To identify a zone member by port number, use the domain identification number of the managed product and the port number on that managed product. For example:

```
Domain 1, Port 1
```

**NOTE:** Port numbers cannot be used for zone members if the interoperability mode for the Switch or Director is set to Open Fabric 1.0 mode.

Port numbers can be 0-n, with n representing the number of ports on the managed product minus one. When you define a zone member by a port number, any device attached through that port is included in the zone. A port number that you assign as a zone member is automatically prefixed with the domain identification number of the managed product.

The advantage of identifying a zone member by port number is that if the HBA on an attached device fails, you do not have to identify the member with the WWN of the replacement HBA.

A disadvantage of port zoning is that someone may rearrange cable connections to ports (because of port failures or other reasons) and inadvertently allow devices to communicate that should not have access to each other.

**NOTE:** If a managed product's Domain ID changes, you must reconfigure all zones that contained the managed product's port as a zone member. HP recommends assigning unique preferred Domain ID's to each Switch in the fabric using the **Configure Switch Parameters** dialog box in the Product Manager.

## Default Zone

A default zone consists of all devices that have not been configured as members of a zone in a currently-active zone set. Here are some important points to remember about zone sets:

- While viewing the **Fabrics** tab, you can enable or disable the default zone separately from the active zone set by selecting the **Configure Default Zone** option from the **Advanced Zoning** options in the **Configure** menu. Enabling the default zone allows all devices and ports not configured as members of the active zone set to communicate. If the default zone is disabled, these ports and devices cannot communicate.
- When no zone set is activated, then all devices are considered to be in the default zone.
- If a zone set is active, then all connected devices that are not included as a members of a zone in the active zone set are included in the default zone.

## Zone Sets

A zone set is a group of zones that you can activate or deactivate as a single entity across all managed products in either a single Switch or a multiswitch fabric. Only one zone set can be active at one time. Devices that are members of zones in the zone set can only communicate with members of zones in the same zone set. However, devices can be included as members of more than one zone set. By activating a zone set, you are making all zones in the set active.

Refer to [Table 6–2 on page 6-12](#) for details on the number of zones and zone members that you can configure in a zone set and the number of zone sets that you can configure in the HAFM zoning library.

Here are some important points to remember about zone sets:

- If no zone set is active, and the default zone is disabled, then no devices can communicate.
- If you activate a zone set when there is already an active zone set, that set will replace the currently active zone set.
- If you deactivate the current active zone set, then all devices connected in the fabric become members of the default zone.

## Active Zone Set

An active zone set is a zone set that is currently active on a single-switch fabric or across all managed products in a multiswitch fabric. At any time, you can disable zoning by deactivating the active zone set and enabling the default zone, or you can enable zoning by activating a zone set. When a zone set is active, all zones that are members of that zone set are active. Only one zone set can be active for the fabric at one time. If no zones are active, then all devices are considered to be in the default zone.

## Zoning Library

The Zoning Library contains all of the zone members, zones, and zone sets configured through the HAFM. Any zone set in the library may be selected and activated on a fabric. You can view components of this library through dialog boxes and panels in the **Zones** and **Zone Sets** tabs of the **Zoning Library** dialog box.

## Merging Zoned Fabrics

Managed products are linked through ISLs to form multiswitch fabrics. In a multiswitch fabric, the active zoning configuration applies to the entire fabric. Any change to the configuration applies to all Switches in the fabric.

## Configurations of Merged Zoned Fabrics

When fabrics join through an ISL, adjacent managed products exchange active zone configurations and determine if the configurations are compatible and can merge. If the configurations can merge, the fabrics join. The resulting configuration will be a single zone set containing zone definitions from each fabric.

If configurations cannot merge, the expansion ports (E\_Ports) on each product become segmented. Segmented E\_Ports cannot carry traffic from attached devices (class 2 or 3 traffic), but can carry management and control traffic (class F traffic) between managed products.

Zoning configurations are compatible if the active zone names in each fabric are unique. If there are identical zone names in each fabric, then the zones must have identical members for the fabrics to join.

## Rules for Merging Zoned Fabrics

Certain rules are enforced to ensure that zoning is consistent across the fabric. [Table 6–1 on page 6-10](#) summarizes rules for joining two fabrics through an ISL. The following terms are used in the table:

- Not zoned

No zone set is active in the fabric and the default zone is enabled. In other words, all devices in the fabric are visible to all other devices in the fabric.

- Zoned

A zone set is active in the fabric and/or the default zone is disabled. In this case, devices can discover other devices that are members of the same zone.

- Zoning configuration

Combination of the active zone set definition and the default zone state (enabled or disabled)

**Table 6–1: Merging Fabrics — Results for Zone Configurations**

Fabric A	Fabric B	Result
Not zoned	Not zoned	Fabrics join successfully. The new fabric remains not zoned.
Not zoned	Zoned	Fabrics join successfully and the active zone set will propagate across the fabric. Fabric A inherits zoning configuration from Fabric B.
Zoned	Not zoned	Fabrics join successfully and the active zone set will propagate across the fabric. Fabric B inherits zoning configuration from Fabric A.
Zoned	Zoned	<p>Fabrics can merge if the zone names in each fabric are unique. The resulting active zone set is a union of the zones from each fabric. Once you have merged the two zoned fabrics, click the <b>Save active zone set as</b> button in the <b>Zoning</b> view to save the active zone set to the zone set library.</p> <p>If there is a zone name conflict (the same zone name in each fabric) then the zones must have identical members for the fabrics to join.</p> <p>If the two zones have the same name but contain different members, then the E_Ports will segment and the fabrics will not join.</p>

**NOTE:** If merging zones will result in segmented E\_Ports and the fabrics will not join, you can join the fabrics by deactivating the active zone set on one of the fabrics (default zone is enabled). This eliminates any conflicts because the fabrics will then join using only the active zone set. After the fabrics join, you can make adjustments to zoning configurations as you desire.

## Configuring Zoning through the HAFM

This section provides procedures for using the menu options available through the HAFM **Fabrics** tab to configure and manage zoning. For information on other menu options, refer to [Chapter 3, Using the Menu Bar](#).

To configure new zones and a zone set, then activate a new zone set for the fabric, follow these three steps:

1. Create zones. Follow steps under [Configure Zones on page 6-14](#) under [Configuring Zoning through the HAFM](#).
2. Create a zone set. Follow steps under [Configure Zone Sets on page 6-17](#) under [Configuring Zoning through the HAFM](#).
3. Activate the zone set. Follow steps under [Activate Zone Sets on page 6-26](#).

**NOTE:** Designing zoning can be a complex task, especially for multiswitch fabrics. You should obtain help from HP's professional services organization before configuring zoning.

## Using the Zoning Library

Open the **Zoning Library** dialog box in either the **Products** or **Fabrics** tab by choosing **Zoning Library** from the **Configure** menu on the menu tab.



Figure 6–3: Zoning Library dialog box

Use this dialog box to perform major tasks for configuring zoning on the fabric:

- Display zone sets, zones, and zone members in library
- Configure zones by adding zone members (attached nodes)
- Configure zone sets by adding zones
- Clear zones
- Delete zones and zone sets
- Import and export zone sets
- Display zone and zone set properties
- Copy zones and zone sets
- Find zone members in zones
- Find zones in zone sets

The following table lists the configuration limits for zone members, zones, and zone sets in the HAFM.

**Table 6–2: Zoning Configuration Limits for High Availability Fabric Manager**

<b>Zoning Configuration</b>	<b>Limit</b>
Number of zones in Zoning Library	2,000
Number of zone sets in Zoning Library	64
Number of members in zone	1,024
Number of zones	1,024 (1,023 plus the default zone)
Number of unique zone members in a zone set	1,024
Number of members in a zone set (with duplicate members allowed)	8,192
Characters per zoning name	64

The supported number of zones is based on a zone name with a maximum of 32 characters. On all products except the Director 2/140, the maximum number of zones decreases if full 64 character names are used. The supported limits are based on two members per zone.

## Menus

The following menus and options are available in the **Zoning Library** dialog box. Page numbers are provided for procedures in using these options. Options under specific menus may only be enabled or perform different functions depending on whether the **Zones** or **Zone Sets** tab is selected.

**Table 6–3: Menu Options in Zoning dialog boxes**

Menu	Menu Option	Procedures
<b>File</b> (menu bar)	<b>New</b> (Zones Tab)	<a href="#">Configure Zones, page 6-14</a>
<b>File</b> (menu bar)	<b>New</b> (Zone Sets Tab)	<a href="#">Configure Zone Sets, page 6-17</a>
<b>File</b> (menu bar)	<b>Open</b>	<a href="#">Modify Zones and Zone Sets, page 6-19</a>
<b>File</b> (menu bar)	<b>Rename</b>	<a href="#">Rename Zones and Zone Sets, page 6-21</a>
<b>File</b> (menu bar)	<b>Delete</b>	<a href="#">Delete Zones and Zone Sets, page 6-21</a>
<b>File</b> (menu bar)	<b>Import Zone Set</b>	<a href="#">Import and Export Zone Sets, page 6-22</a>
<b>File</b> (menu bar)	<b>Export Zone Set</b>	<a href="#">Import and Export Zone Sets, page 6-22</a>
<b>File</b> (menu bar)	<b>Properties</b>	<a href="#">Display Zone and Zone Set Properties, page 6-22</a>
<b>File</b> (menu bar)	<b>Close</b>	<a href="#">Closing the Zoning Library, page 6-26</a>
<b>Edit</b> (menu bar)	<b>Copy Zone Set (Zone Sets tab)</b>	<a href="#">Copy Zones and Zone Sets, page 6-20</a>
<b>Edit</b> (menu bar)	<b>Copy Zone (Zones tab)</b>	<a href="#">Copy Zones and Zone Sets, page 6-20</a>
<b>Edit</b> (menu bar)	<b>Find Zone (Zones tab)</b>	<a href="#">Find Zones, page 6-24</a>
<b>Edit</b> (menu bar)	<b>Find Member</b>	<a href="#">Find Zone Members, page 6-25</a>
Right-click menu (zoning library)	<b>Open (Zones tab)</b>	<a href="#">Modify Zones and Zone Sets, page 6-19</a>
Right-click menu (zoning library)	<b>Rename</b>	<a href="#">Rename Zones and Zone Sets, page 6-21</a>

Menu	Menu Option	Procedures
Right-click menu (zoning library)	<b>Delete</b>	<a href="#">Delete Zones and Zone Sets, page 6-21</a>
Right-click menu (zoning library)	<b>Properties</b>	<a href="#">Display Zone and Zone Set Properties, page 6-22</a>

## Display Configured Zone Sets and Zones

Click the **Zone Sets** tab (default) to display all configured zone sets.

Click the **Zones** tab (default) to display all configured zones.

Click a zone set or zone to select it. Once selected, use options from the **File** menu to modify, rename, delete, or obtain properties for zones and zone sets. Use options from the **Edit** menu to copy zone sets, copy zones, find zones in zone sets, and find members in zones.

## Configure Zones

A zone is a set of members. These members can be physical ports of managed products in a fabric or nodes attached to managed products. Ports are identified by the managed product domain and physical port member. Devices are identified by the WWN of the device. You can configure up to 4,096 members in a single zone.

Use the following steps to configure a zone:

1. Open the Zoning Library by choosing **Configure > Zoning Library**.
2. Click the **Zones** tab.
3. Choose **File > New**. The **New Zone** dialog box displays ([Figure 6-4 on page 6-15](#)).
4. Enter a name for the zone in the **Zone Name** field.

**NOTE:** Names for zones and zone sets must follow specific rules. Refer to [Naming Conventions for Zones and Zone Sets on page 6-5](#) for details.

5. Select the fabric for which zoning is being configured from the drop-down menu.
6. In the **Attached ports/nodes** area, click the icon to the left of a numbered domain folder to display a list of ports and attached nodes for the Director or Switch. Note that the WWN for the Switch or Director displays to the right of the product's domain number.

A list of ports with attached nodes expands under the selected domain.



**Figure 6–4: New Zone dialog box**

**NOTE:** The icon that you click to expand the list of ports may not appear by a domain where no nodes attached to ports.

7. Add members to the new zone using the following steps:
  - a. Decide if you want to add members by port number or WWN of attached node.
    - If you want to add zone members by port number only (not supported in Open Fabric 1.0 interop mode), click the **Add by Port** radio button at the bottom of the display area. Click the icon next to the domain folder again to display only the products in the **Attached ports/nodes** area. If the operating mode is set to Open Fabric Mode and you select the **Add by port number** option, a message will display indicating that “Zoning may be configured by port but will actually be enforced by WWN in Open Fabric Mode”
    - If you want to add zone members by the WWNs of attached nodes, click the **Add by WWN** radio button, then click the icon by the domain folder again. This displays all ports and the WWNs of nodes attached to those ports in the **Attached ports/nodes** area. To display nodes by their WWN or nicknames (if configured), click the **Display Options** button and select either **Nickname** or **World Wide Name** from the **Display Options** dialog box. Click the icon by the domain folder again to expand the list of nodes.

- b. Click a node or port in the expanded list to highlight it. To select multiple members individually, press **Ctrl** and click members. To select multiple members in order, press **Shift** and click the first and last members of the group you want to move.
8. Click the **Add >>** button to move the selections to the **Members in zone** area on the right side of the screen.

Figure 6–5 illustrates members added to the new zone. The first two items in the **Members in zone** area were added with **Add by port** selected. The next two items were added with **Add by WWN** selected.



Figure 6–5: New Zone dialog box — Adding Zone Members

9. To add nodes that are not listed in the **Attached ports/nodes** area (for example, detached nodes), click **Add Detached Nodes** at the bottom of the **Members in zone** area. The **Add Detached Nodes** dialog box displays.



Figure 6–6: Add Detached Nodes dialog box

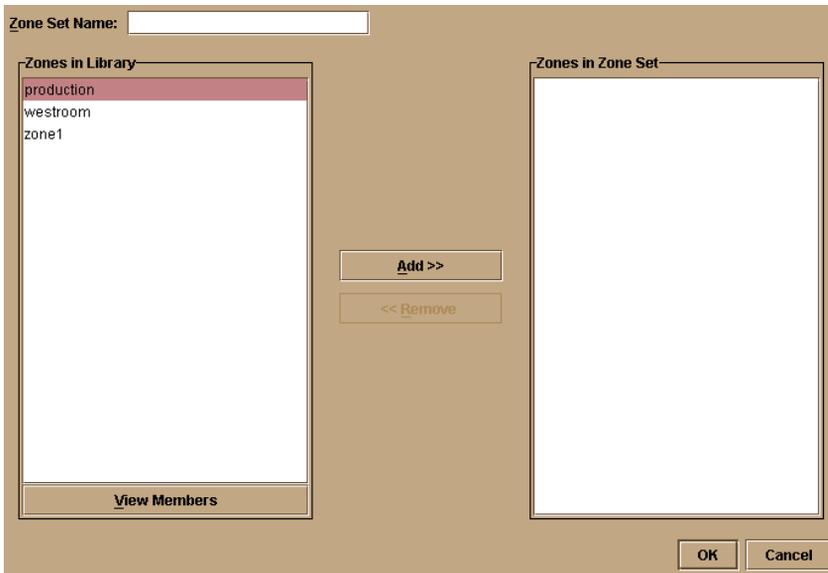
10. Either click **World Wide Name** and enter a valid 16-digit WWN or click **Nickname** and enter a configured nickname for the WWN into the corresponding field. (Note that the nickname must have been configured through the **Configure Nicknames** dialog box first.)
11. To remove members from the zone, select them and click the << **Remove** button. To remove all of the members, click **Clear Zone** at the bottom of the **Members in zone** area. Click **Yes** when the **Warning** dialog box displays.
12. To accept the zone, click **OK**. The **New Zone** dialog box closes and the new zone displays in the **Zones** tab of the **Zoning Library** dialog box.

## Configure Zone Sets

A zone set is a collection of zones that you can activate or deactivate as a single entity across all managed products in a multiswitch fabric or on one product in a single Switch fabric. Members in each zone are identified using the steps in [Configure Zones on page 6-14](#).

For specifications on the number of zones in a zone set and the number of zone sets that you can configure in the HAFM library, refer to [Table 6-2 on page 6-12](#).

1. Open the Zoning Library by choosing **Configure > Zoning Library**.
2. The **Zone Sets** tab should display as the default. If not, click the **Zone Sets** tab.
3. Choose **File > New**. The **New Zone Set** dialog box displays ([Figure 6-7 on page 6-18](#)).



**Figure 6–7: New Zone Set dialog box**

Configured zones should display in the **Zones in Library** area. If zones do not display, you must first configure zones before you can configure any zone sets.

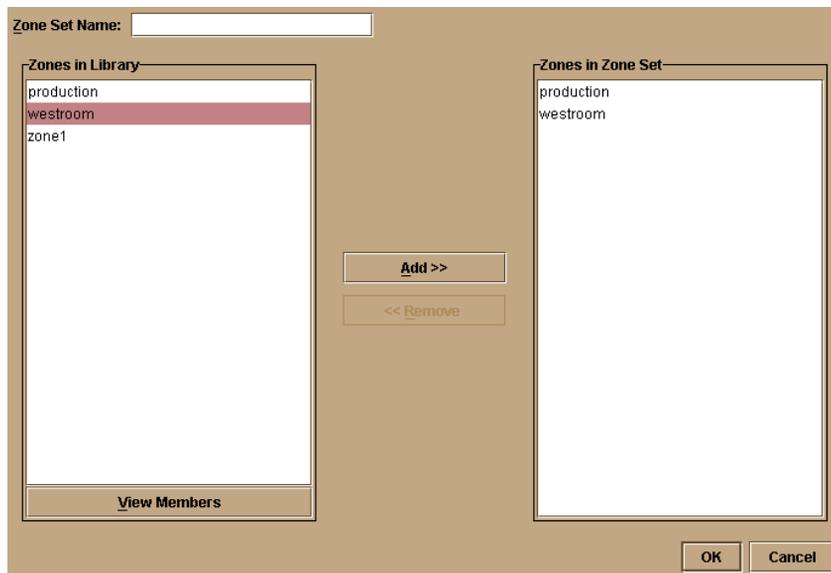
To view members in the zones displayed, click a zone to select it, then click **View Members** at the bottom of the **Zones in Library** field.

4. Enter a name for the new zone set in the **Zone Set Name** field.  
Names for zones and zone sets must follow specific rules. Refer to [Naming Conventions for Zones and Zone Sets on page 6-5](#) for details.
5. Add zones to the new zone set by selecting a zone in the **Zones in Library** section and clicking **Add >>**.

**NOTE:** To move multiple zones, press the **Ctrl** or **Shift** key while clicking the zones.

6. Remove zones from the **Zones in Zone Set** section by selecting the zones and clicking **<<Remove**.

[Figure 6–8 on page 6-19](#) shows zones added to the **Zones in Zone Set** section.



**Figure 6–8: New Zone Set dialog box — Adding Zones**

7. To accept the zone set, click **OK**. The **New Zone Set** dialog box closes and the new zone set displays in the **Zone Set** tab of the **Zoning Library** dialog box.

## Modify Zones and Zone Sets

Use the following procedures to modify existing zones and zone sets using the **Open** option in the **File** menu.

### Zones

1. Choose the **Zones** tab in the **Zoning Library** dialog box.
2. Click a zone in the library to select it.
3. Click **File > Modify** or right-click the zone and choose **Modify** from the pop-up menu.

The **Modify Zone** dialog box displays.

4. Use steps, starting with Step 5 under [Configure Zones on page 6-14](#), to add zone members, remove zone members, or clear zones. Note that the zone name cannot be changed in this dialog box. Choose the zone in the **Zoning Library** dialog box, then choose **Rename from the File** menu to do this.

## Zone Sets

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Click a zone set to select it in the library.
3. Click **File > Modify**.  
The **Modify Zone Set** dialog box displays.
4. Use steps, starting with Step 5 under [Configure Zone Sets on page 6-17](#), to view zone members or add or remove zones from zone sets. Note that the zone set name cannot be changed in this dialog box. Choose the zone set in the **Zoning Library** dialog box, then choose **File > Rename**.

## Copy Zones and Zone Sets

Copy zones and zone sets to a zone or zone set with a different name using the following steps.

### Zones

1. Choose the **Zones** tab in the **Zoning Library** dialog box.
2. Click a zone to select it in the library.
3. Choose **Edit > Copy Zone**.
4. When the **Copy Zone** dialog box displays, enter a name of up to 64 characters (no spaces) for the zone.
5. Click **OK** and the new zone displays in the **Zoning Library** dialog box.

### Zone Sets

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Click a zone to select it in the library.
3. Choose **Edit > Copy Zone**.
4. When the **Copy Zone Set** dialog box displays, enter a name of up to 64 characters (no spaces) for the zone.
5. Click **OK** and the new zone set displays in the **Zoning Library** dialog box.

## Delete Zones and Zone Sets

### Zones

1. Choose the **Zones** tab in the **Zoning Library** dialog box.
2. Click a zone to select it and choose **File > Delete**, or right-click the zone and choose **Delete** from the pop-up menu.
3. Click **Yes** when the **Warning** dialog box displays to confirm the deletion.

### Zone Sets

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Click a zone set to select it and choose **File > Delete**, or right-click the zone and choose **Delete** from the pop-up menu.
3. Click **Yes** when the **Warning** dialog box displays to confirm the deletion.

## Rename Zones and Zone Sets

Delete zones and zone sets from the library using the following steps:

### Zones

1. Choose the **Zones** tab in the **Zoning Library** dialog box.
2. Click a zone to select it and choose **File > Rename**, or right-click the zone and choose **Rename** from the pop-up menu.
3. When the **Rename** dialog box displays, enter a new name.  
Names for zones and zone sets must follow specific rules. Refer to [Naming Conventions for Zones and Zone Sets on page 6-5](#) for details.
4. Click **OK**, and the zone is renamed in the **Zoning Library** dialog box.

### Zone Sets

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Click a zone set to select it and choose **File > Rename**, or right-click the zone and choose **Rename** from the pop-up menu.
3. When the **Rename** dialog box displays, enter a new name of up to 64 characters.
4. Click **OK**, and the zone set is renamed in the **Zoning Library** dialog box.

## Import and Export Zone Sets

While using the **Zone Sets** tab, use these options from the **File** menu to export a zone set as an .xml file and import the zone set into another zoning library. Note that you cannot import the zone set if it contains zones that are already in new zoning library. If you do, an error message displays for all zones that are not compatible.

### Export Zone Set

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Choose a zone set for export.
3. Choose **File > Export Zone Set**.

The **Export Zone Set** dialog box displays.

4. Enter a name in the dialog box for the .xml file in the **File Name** field, select a folder on your C: drive or network drive where you want to save the file, then click **Save**.

The file saves in the location with an “.xml” extension (for example, *zoneset.xml*).

### Import Zone Set

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Choose **File > Import**.

The **Import Zone Set** dialog box displays.

3. Find the exported zone set file with the “.xml” extension by opening folders in the display area and selecting directories through the **Look in** drop-down list.
4. Click **Import**.

The zone set is added to the HAFM server’s zoning library.

If the imported zone set contains zones that are already in the library, an error message displays.

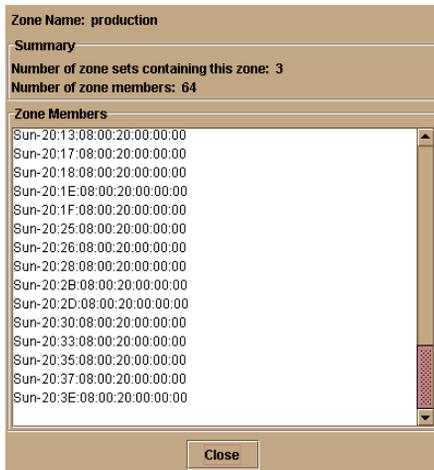
### Display Zone and Zone Set Properties

**Zone** and **Zone Set Properties** boxes summarize details on selected zones and zone sets.

## Zones

1. Choose the **Zones** tab in the **Zoning Library** dialog box.
2. Click a zone to select it and choose **File > Properties**, or right-click the zone and choose **Properties** from the pop-up menu.

The **Zone Properties** dialog box displays (Figure 6–9).



**Figure 6–9: Zone Properties dialog box**

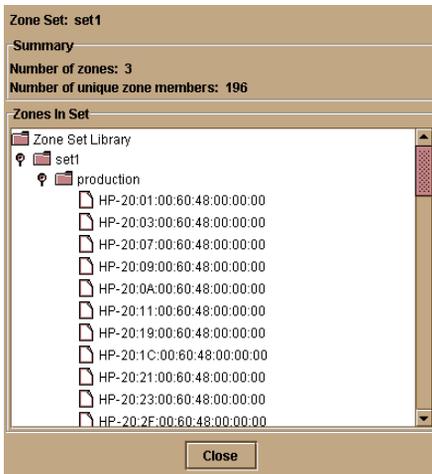
The dialog box summarizes the number of zone sets containing the same zone and lists the zone members in the zone.

3. Click **Close** to close the dialog box.

## Zone Sets

1. Choose the **Zone Sets** tab in the **Zoning Library** dialog box.
2. Click a zone set to select it and choose **File > Properties**, or right-click the zone and choose **Properties** from the pop-up menu.

The **Zone Set Properties** dialog box displays (Figure 6–10).



**Figure 6–10: Zone Set Properties dialog box**

The dialog box summarizes the number of zones and unique zone members in the zone set. The Zone Set Library, consisting of the zone set, its zones, and zone members, are displayed in a tree structure in the **Zones In Set** display area. Click the icon to the left of the zone set folder to expand the list of zones in the set. Click the icon to the left of a zone folder to expand the list of members in that zone.

3. Click **Close** to close the dialog box.

## Find Zones

You can find zones by using the **Find Zone** option in the **Edit** menu (**Zones** tab). Use this option to get a quick view of which zone sets a selected zone is part of. Once you find a zone in a specific zone set, you can remove the zone from the zone set using the **Remove** button on the **Find Zone** dialog box. To find zones:

1. Choose the **Zones** tab in the **Zoning Library** dialog box.
2. Click a zone to select it.
3. Choose **Edit > Find Zone**.

The **Find Zone** dialog box displays listing all zone sets where the zone was found.

4. If you want to remove the zone from zone sets, click **Remove**.

The **Remove Zone** dialog box displays with the radio button selected to remove the zone from the zone set that is currently selected in the **Zone Sets** tab.

5. Perform one of the following tasks:
  - Click **OK** to remove the zone from the selected zone set.
  - Click the **All Zone Sets** radio button, then **OK** to remove the zone from all zone sets in the library.

## Find Zone Members

Use this option to find zones where a zone member's WWN or nickname (if configured) is located. Once located, you can remove the member from specific zones or all zones or replace the member with a different WWN or nickname.

1. While in either the **Zones** or **Zone Sets** tab, choose **Edit > Find Member**.
2. The **Find WWN/Nickname** dialog box displays.
3. Enter a valid WWN or nickname (if configured) and click **OK**.

The **Find WWN/Nickname** dialog box displays listing all zones where the member was found in the right part of the dialog box and zone sets where the zones were found in the left part of the dialog box. You can click the zone sets and zones that display in the dialog box to select them.

World Wide Name: 20:01:00:60:48:00:00:00 belongs to:	
Zone Set	Zone
set1	production
set1	westroom
set1	zone1
storage1A	production
storage1A	westroom
storage1A	zone1
Zone3	production
Zone3	westroom
Zone3	zone1

**Figure 6–11: Find WWN/Nickname dialog box**

4. If you want to remove or replace the member in a specific zone or all zones, click a zone set and zone listed in the to select it. Note that the zone may be in more than one zone set.
5. Click **Remove**.

The **Remove WWN/Nickname** dialog box displays with the a radio button selected to remove the member from the selected zone.

6. Perform one of the following tasks:
  - Click **OK** to remove the member from the selected zone
  - Click the **All Zones** button to remove the member from all zones in the library and click **OK**.
7. To replace the member in a specific zone with another member:
  - a. Choose a zone set and zone in the **Find WWN/Nickname** dialog box, then click the **Replace** button.
  - b. When the **Replace WWN/Nickname** dialog box displays, enter the WWN or nickname of the member that you want to substitute for the member in the selected zone, then click **OK**. The member is replaced with the one you entered into the dialog box.

## Closing the Zoning Library

Choose **File > Close** to close the **Zoning Library** dialog box.

## Activate Zone Sets

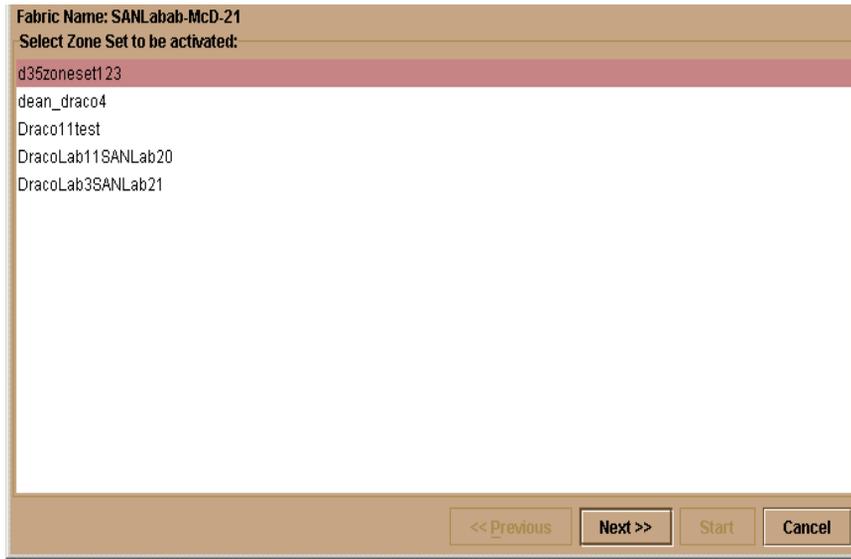
Choose the **Activate Zone Set** option from the **Configure** menu on the HAFM menu bar to activate a zone set to control access between devices in a fabric. Only one zone set in the fabric can be active at one time. Activating a zone set replaces the current active zone set with the one you activate.

Note that changing the configuration for an active zone set does not dynamically apply changes. For any change to a zone set, even modifying members in a zone that belongs to a zone set, activate the zone set using the following steps.

**NOTE:** It is not necessary to deactivate the active zone set before activating a new zone set.

1. Choose the **Fabrics** tab.
2. Choose the fabric in the **Fabric Tree** area for which the zone set is to be activated.

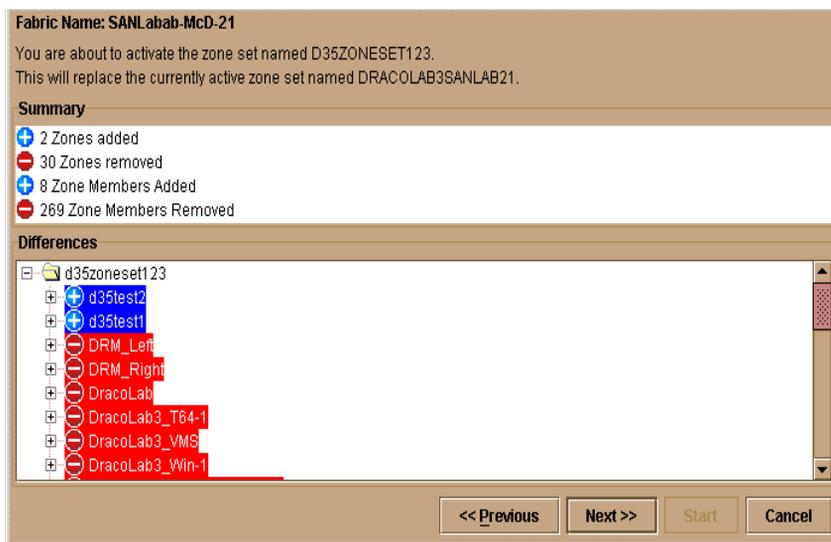
3. Open the **Activate Zone Set** dialog box (Figure 6–12) by choosing **Configure > Activate Zone Set**. The dialog box displays all zone sets currently configured for the fabric.



**Figure 6–12: Activate Zone Set dialog box**

4. Click a zone set to select it.
5. Click **Next** to begin the activation.

An **Activate Zone Set** screen (Figure 6–13 on page 6-28) displays that shows the differences between the zone set that you are activating and the old zone set. In the differences area, click the icon before the zone set name to expand the list of zones in the set.



**Figure 6–13: Activate Zone Set (Differences) screen**

Determine which zones will be added and removed when the previous zone set is replaced with the new zone set by the icons and text color displayed in the expanded list of zone names.

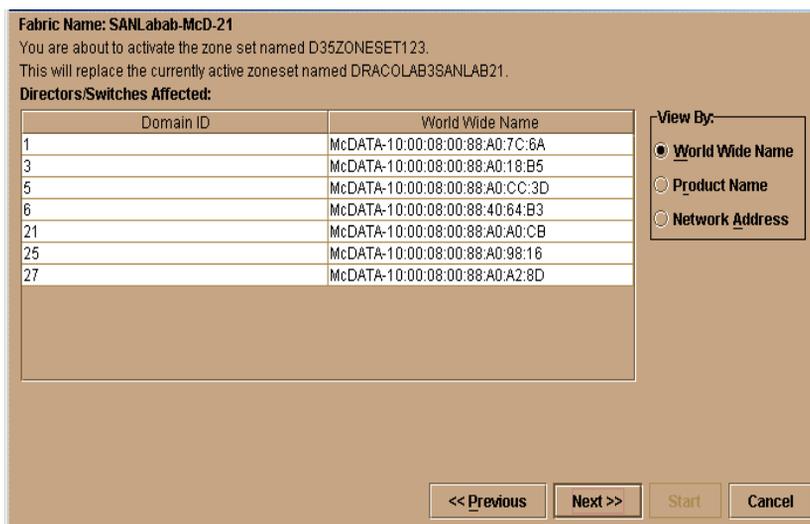
**Table 6–4: Icons and Text Indicators for Zone Set Differences**

Icon	Zone Name Text Color	Meaning
Blue circle containing white plus (+) sign.	Blue	Zone to be added for active zone.
Red circle containing white minus (-) sign.	Red	Zone to be removed for active zone.

6. Click **Next**.

An **Activate Zone Set** screen (Figure 6–14 on page 6-29) displays, listing the Directors and Switches affected by the change in active zone sets. The Switch/Director domain ID displays in the left panel and the WWN displays in the right panel. The domain ID is a unique domain identification of a Switch or Director product (for example, 1-31).

Messages may display in this screen warning you of possible consequences when activating the new zone set.



**Figure 6–14: Activate Zone Set (Directors/Switches Affected) screen**

Click the radio buttons in the **View By** area to change the display in the right panel between Director/Switch WWN, the product name configured through the Product Manager, and the network address (or DNS host name).

7. Click **Next**.

A **Status** screen displays with further instructions.

8. Click **Start** to activate the zone set.

Messages appear in the screen about activation status in the fabric.

9. When the **Activate zone Set complete** message displays, click **Close** to close the dialog box and complete the process.

## Deactivate Zone Sets

To deactivate zone sets:

1. Select the fabric in the **Fabric Tree** area for which the zone set is to be deactivated.
2. Choose **Configure > Deactivate Zone Set (Advanced Zoning submenu)**. The **Deactivate Zone Set** dialog box displays. Use this dialog box to deactivate the current active zone set.
3. Click **Start** to begin the process and messages display to indicate deactivation status. When the **Close button** displays, you can close the dialog box.

## Configure the Default Zone

To configure the default zone:

1. Select the fabric in the **Fabric Tree** area for which the default zone is to be configured.
2. Choose the **Configure > Configure Default Zone (Advanced Zoning submenu)**. The **Configure Default Zone** dialog box displays. Use this dialog box to enable and disable the default zone.
3. The **Configure Default Zone** dialog box displays the current state of the default zone (enabled or disabled). Depending on the current state, press **Start** to enable or disable the zone. Messages display to indicate process status. When the **Close** button displays, you can close the dialog box.

A default zone consists of all devices that have not been configured as members of a zone in a currently-active zone set. When no zone set is active, then all devices are considered to be in the default zone. If a zone set is active, then all connected devices that are not included in at least one of the zones in the active zone set are included in the default zone.

Enabling the default zone allows any device in the default zone to see any other device in the default zone. If the default zone is disabled and no zone set is active, then devices connected to the product cannot communicate.

## Show Zone Members

To show zone members:

1. Select the fabric in the **Fabric Tree** area for which zone members are to be shown.
2. Click the **Fabrics > Show Zone Members** to display the **Show Zone Members** dialog box.

This dialog box displays a tree of all products in the fabric in the left panel.

3. Click an icon by a product name to expand the list of attached nodes.
4. Select a node, and the WWNs (or nicknames, if configured) of nodes that are members of the same zone as the node selected display in the right panel.

Refer to [Chapter 6](#) for details on zoning and zoning configuration.

## Backing Up Zoning Configurations

As long as a Zip disk is kept in the Zip drive on the HAFM server, configuration data and other critical information will be backed up to the disk automatically when the data directory contents change or the HAFM server is rebooted. This function is handled through the Iomega *QuikSync* application. Refer to [Backing Up and Restoring Data on page 1-8](#) for more information.



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## HAFM Logs

This chapter contains information on the High Availability Fabric Manager logs.

### Using Logs

The Audit, Session, Product Status, and Fabric Logs store up to 1000 entries each. The most recent entry displays at the top of the log. After 1000 entries are stored, new entries overwrite the oldest entries.

The Event Log stores up to 500 entries. The most recent entry displays at the top of the log. After 500 entries are stored, new entries overwrite the oldest entries.

### Sorting Logs

Sorting log entries is the same for all logs. Sort log entries in columns by clicking a column heading. For columns that contain text, the columns are sorted alphabetically. For columns with data, such as date and time, the columns are sorted by date. The default view for all logs is to show the most current event based on date and time when the event occurred.

A down arrow in the header indicates sorting in descending order. An up arrow indicates sorting in ascending order. Click once to sort. Click again to reverse the sort.

### Button Function

Button function is the same for all logs:

- **Export**  
Click **Export** to display the **Save** dialog box shown in [Figure 7-6 on page 7-8](#). Click **Home** to display the folders that are stored in your home directory. If you choose, you may create a folder for your home directory and save the file there.
- **Clear**  
Click **Clear** to clear all entries for all users. A **Warning** dialog box displays requesting confirmation that you want to clear all entries in the log.

- **Refresh**  
Click **Refresh** to update the display.
- **Close**  
Click **Close** to close the log.

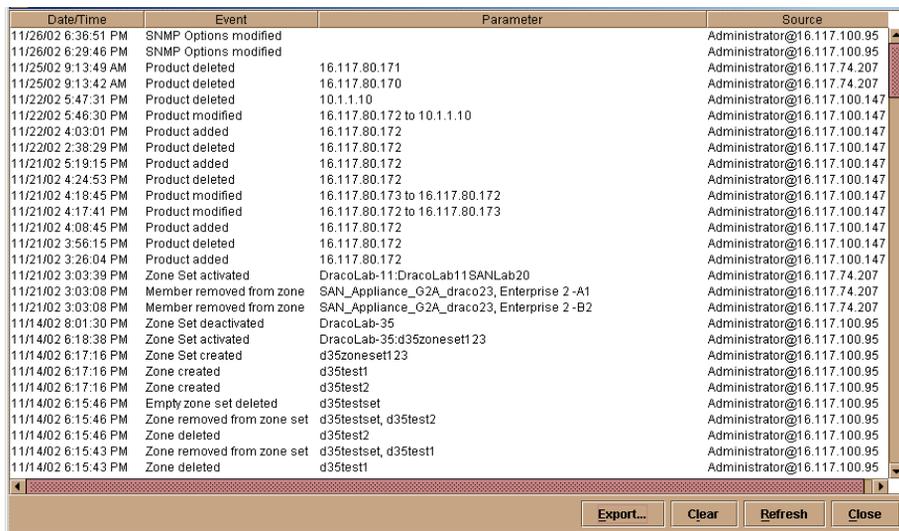
## Expanding Columns

Expand columns in logs by placing the pointer over the line separating column headings until a double arrow displays, then drag the line to widen the column as necessary.

## High Availability Fabric Manager Audit Log

The HAFM Audit Log displays a history of user actions performed through the HAFM. The log stores up to 1000 entries, the most recent displaying at the top of the log. After 1000 entries have been stored, new entries take the place of the log's oldest entries.

To display the Audit Log, choose **Logs > Audit Log**. The Audit Log displays (Figure 7-1 on page 7-2).



Date/Time	Event	Parameter	Source
11/26/02 6:36:51 PM	SNMP Options modified		Administrator@16.117.100.95
11/26/02 6:29:46 PM	SNMP Options modified		Administrator@16.117.100.95
11/25/02 9:13:49 AM	Product deleted	16.117.80.171	Administrator@16.117.74.207
11/25/02 9:13:42 AM	Product deleted	16.117.80.170	Administrator@16.117.74.207
11/22/02 5:47:31 PM	Product deleted	10.1.1.10	Administrator@16.117.100.147
11/22/02 5:46:30 PM	Product modified	16.117.80.172 to 10.1.1.10	Administrator@16.117.100.147
11/22/02 4:03:01 PM	Product added	16.117.80.172	Administrator@16.117.100.147
11/22/02 2:38:29 PM	Product deleted	16.117.80.172	Administrator@16.117.100.147
11/21/02 5:19:15 PM	Product added	16.117.80.172	Administrator@16.117.100.147
11/21/02 4:24:53 PM	Product deleted	16.117.80.172	Administrator@16.117.100.147
11/21/02 4:18:45 PM	Product modified	16.117.80.173 to 16.117.80.172	Administrator@16.117.100.147
11/21/02 4:17:41 PM	Product modified	16.117.80.172 to 16.117.80.173	Administrator@16.117.100.147
11/21/02 4:08:45 PM	Product added	16.117.80.172	Administrator@16.117.100.147
11/21/02 3:56:15 PM	Product deleted	16.117.80.172	Administrator@16.117.100.147
11/21/02 3:26:04 PM	Product added	16.117.80.172	Administrator@16.117.100.147
11/21/02 3:03:39 PM	Zone Set activated	DracoLab-11:DracoLab11SANLab20	Administrator@16.117.74.207
11/21/02 3:03:08 PM	Member removed from zone	SAN_Appliance_GZA_draco23, Enterprise 2-A1	Administrator@16.117.74.207
11/21/02 3:03:08 PM	Member removed from zone	SAN_Appliance_GZA_draco23, Enterprise 2-B2	Administrator@16.117.74.207
11/1/02 8:01:30 PM	Zone Set deactivated	DracoLab-35	Administrator@16.117.100.95
11/1/02 8:18:38 PM	Zone Set activated	DracoLab-35:d35zoneset1 23	Administrator@16.117.100.95
11/1/02 8:17:16 PM	Zone Set created	d35zoneset1 23	Administrator@16.117.100.95
11/1/02 8:17:16 PM	Zone created	d35test1	Administrator@16.117.100.95
11/1/02 8:17:16 PM	Zone created	d35test2	Administrator@16.117.100.95
11/1/02 8:15:46 PM	Empty zone set deleted	d35testset	Administrator@16.117.100.95
11/1/02 8:15:46 PM	Zone removed from zone set	d35testset, d35test2	Administrator@16.117.100.95
11/1/02 8:15:46 PM	Zone deleted	d35test2	Administrator@16.117.100.95
11/1/02 8:15:43 PM	Zone removed from zone set	d35testset, d35test1	Administrator@16.117.100.95
11/1/02 8:15:43 PM	Zone deleted	d35test1	Administrator@16.117.100.95

**Figure 7-1: High Availability Fabric Manager Audit Log**

- The **Date/Time** column logs the date and time that the logged event took place.

- The **Event** column describes the action that took place. Logged actions could include:
  - Defining a new product
  - Modifying product attributes
  - Deleting product definitions
  - Defining a new user
  - Modifying user administration
  - Deleting user administration
  - Creating a zone set
  - Modifying a zone set
  - Modifying SNMP options
- The **Parameter** column describes the parameter affected by the event. For example, if a product is added or deleted, the product's network address displays as shown in [Figure 7-1](#).

Note that the type of network address that displays—such as network IP address or host name—is determined on a product-by-product basis according to how the product is identified in the **New Product** dialog box.
- The **Source** column identifies the workstation from which the user performed the logged action. If the change was made locally from the HAFM server, the HAFM server address displays.

## High Availability Fabric Manager Event Log

The HAFM Event Log displays events or error conditions recorded by the *HAFM Services* application. Entries reflect the status of the application and managed Switches or Directors.

Information associated with a call-home failure is intended for use by maintenance personnel to fault isolate the problem (modem failure, no dial tone, etc.), while information provided in all other entries is generally intended for use by third-level support personnel to fault isolate more significant problems.

The log stores up to 500 entries, the most recent displaying at the top of the log. After 500 entries are stored, new entries take the place of the oldest entries.

To display the Event Log, choose **Logs > Event Log**. The Event Log displays (Figure 7–2).

Date/Time	Event	Product	Qualifier	Data
5/3/02 7:02:47 AM	52-Services started	HAFM Services	0	06.00.00
5/2/02 3:03:39 PM	52-Services started	HAFM Services	0	06.00.00
5/2/02 9:26:13 AM	52-Services started	HAFM Services	0	06.00.00
5/1/02 1:33:22 PM	52-Services started	HAFM Services	0	06.00.00

Export... Clear Refresh Close

**Figure 7–2: High Availability Fabric Manager Event Log**

- The **Date/Time** column logs the date and time the event was reported to the HAFM server.
- The **Event** column lists an event number and brief description of the event. Includes both the event number and description when reporting an event to third-level customer support.
- The **Product** column lists the product associated with the event. Some events are associated with the *HAFM Services* application, while others are associated with a specific instance of the *Product Manager* application. In the latter case, the product (such as Director 2/64) and configured name (or IP address) associated with the instance are displayed.
- The **Qualifier** column provides an event qualifier for use by engineering personnel. Include this number when reporting an event to third-level customer support.
- The **Data** column includes additional event data for use in fault isolating a problem. Use the information when fault isolating a call-home problem, or include the information when reporting an event to third-level customer support.

## High Availability Fabric Manager Session Log

The HAFM Session Log provides the date/time, user name, and network address of each login and logout on the HAFM server.

To display the Session Log, choose **Logs > Session Log**. The Session Log displays (Figure 7-3 on page 7-5).

Date/Time	Event	User	Network Address
3/25/02 3:17:14 PM	Login	Administrator	172.18.3.136
3/25/02 2:04:46 PM	Logout	Administrator	144.49.232.36
3/25/02 2:03:21 PM	Login	Administrator	144.49.232.36
3/25/02 2:01:46 PM	Logout	Administrator	144.49.232.36
3/25/02 2:00:12 PM	Login	Administrator	144.49.232.36
3/22/02 11:20:28 AM	Logout	Administrator	144.49.41.130
3/22/02 11:20:02 AM	Login	Administrator	144.49.41.130
3/21/02 4:15:20 PM	Logout	Administrator	144.49.38.57
3/21/02 4:08:31 PM	Login	Administrator	144.49.38.57
3/21/02 3:58:34 PM	Logout	Administrator	144.49.232.36
3/21/02 3:55:33 PM	Login	Administrator	144.49.232.36
3/21/02 10:57:29 AM	Login	Administrator	144.49.29.48
3/21/02 10:56:50 AM	Logout	Administrator	144.49.29.48
3/21/02 10:43:47 AM	Login	Administrator	144.49.29.48
3/21/02 10:43:01 AM	Logout	Administrator	144.49.29.48
3/21/02 10:39:07 AM	Logout	Administrator	144.49.232.36
3/21/02 10:32:52 AM	Login	Administrator	144.49.232.36
3/21/02 10:31:11 AM	Login	Administrator	144.49.29.48
3/21/02 10:30:30 AM	Logout	Administrator	144.49.29.48
3/20/02 3:55:42 PM	Logout	Administrator	144.49.232.36
3/20/02 3:54:36 PM	Login	Administrator	144.49.232.36
3/20/02 3:53:25 PM	Logout	Administrator	144.49.41.59
3/20/02 3:47:08 PM	Login	Administrator	144.49.41.59
3/20/02 3:46:11 PM	Logout	Administrator	144.49.41.59
3/20/02 3:37:40 PM	Logout	Administrator	144.49.232.36
3/20/02 3:37:13 PM	Login	Administrator	144.49.41.59
3/20/02 3:36:48 PM	Login	Administrator	144.49.232.36
3/19/02 3:42:46 PM	Logout	Administrator	144.49.41.59

Export... Clear Refresh Close

**Figure 7-3: High Availability Fabric Manager Session Log**

- The **Date/Time** column displays the date and time of the event.
- The **Event** column displays either login or logout.
- The **User** column displays the user name.
- The **Network Address** column displays the IP address of the remote workstation or HAFM server where the user logged in.

## High Availability Fabric Manger Product Status Log

The HAFM Product Status Log reflects the time and nature of significant events on all managed products, and indicates which specific *Product Manager* applications should be opened to further investigate product status changes.

To display the Product Status Log, choose **Logs > Product Status Log** or double click the **Products** icon on the HAFM status bar. The Product Status Log displays (Figure 7–4).

Date/Time	Network Address	Previous Status	New Status
3/11/02 11:29:41 AM	144.49.29.81	Unknown	Operational
3/11/02 11:29:34 AM	10.1.3.11	Unknown	Operational
3/11/02 11:29:31 AM	10.1.3.10	Unknown	Operational
3/11/02 11:13:48 AM	10.1.6.2	Degraded	Operational

Export... Clear Refresh Close

**Figure 7–4: High Availability Fabric Manager Product Status Log**

- The **Date/Time** column displays the date and time of the change in the product's operational status.
- The **Network Address** column displays the IP address or host name of the product.
- The **Previous Status** column displays the product's old or previous operational status (Unknown, Operational, Degraded, or Failed). The Unknown status indicates that the HAFM has lost contact with the product and has initiated a call-home and/or e-mail (if configured).
- The **New Status** column displays the product's current operational status.

## High Availability Fabric Manager Fabric Log

The HAFM Fabric Log reflects the time and nature of significant changes in the managed fabric.

To display the Fabric Log, choose **Fabric Log** from the **Logs** menu or double click the **Fabrics** icon on the HAFM status bar. The Fabric Log displays (Figure 7–5).

Date/Time	Event	Description
4/1/02 9:14:19 AM	ISL added	SLDATA-10:00:08:00:88:A0:50:EA, Port 11 - SLDATA-10:00:08:00:88:20:00:EA, Port 59
4/1/02 9:14:19 AM	ISL added	SLDATA-10:00:08:00:88:20:00:EA, Port 59 - SLDATA-10:00:08:00:88:A0:50:EA, Port 11

Export... Clear Refresh Close

**Figure 7–5: High Availability Fabric Manager Fabric Log**

- The **Date/Time** column displays the date and time of the change in the fabric.
- The **Event** column displays the type of change in the fabric (for example, a Switch was added or removed, an ISL was added or removed, the fabric was renamed or persisted, or a zone set became active).
- The **Description** column displays a description of the change in the fabric.

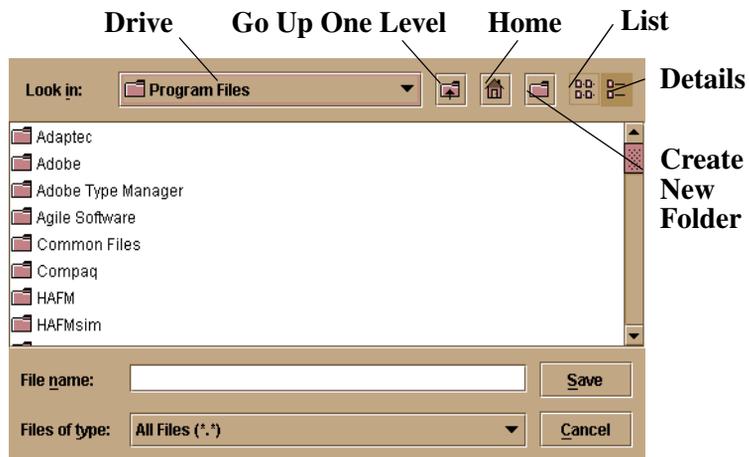
## Export Log Files

To save a log file in American Standard Code for Information Exchange (ASCII) format to a location on your system's hard drive or to a diskette, use the following steps. You can open this file in any desktop publisher for viewing or printing.

1. Click **Export** on the log window.

The Save dialog box displays (Figure 7–6 on page 7-8).

**NOTE:** The folders listed in this dialog box are those that are stored in your home directory.



**Figure 7–6: Save dialog box**

2. In the **Save** dialog box, browse to the folder where you want to save the file.
3. Type a file name and extension in the **File name** field.
4. Click **Save**.

The file saves to the specified folder as an ASCII text file.

---

## Optional Features

This chapter provides detailed information on using, administering, and configuring optional HAFM features through HAFM applications. There are two types of features covered in this chapter:

- “Keyed” features, requiring feature keys to be purchased and enabled through the **Configure Feature Key** dialog box in the product’s Product Manager application.
- Features not requiring feature keys themselves, but requiring that specific keyed features be enabled before they can be accessed through HAFM or Product Manager applications.

### FICON Management Server

The FICON Management Server is a keyed feature that allows host control and inband management of the Director or Switch through an IBM System/390 or zSeries 900 Parallel Enterprise Server server attached to a Director or Switch port. The server communicates with the Switch or Director through a FICON channel. Control of connectivity and statistical product monitoring are provided through a host-attached console.

#### Installation

To install and enable this option, choose the **Configure Feature Key** option on the Product Manager **Configure** menu.

#### Configuring the FICON Management Server

Use this procedure to configure whether the host is the controlling manager.

The optional FICON Management Server feature must be installed in order to perform this procedure.

- **Enable Management Server**

Click this check box to add a check mark and enable the management server.

Click the check mark to remove it and disable this feature.

- **Switch Clock Alert Mode**

Click this check box to display a check mark and enable clock alert mode. If this is enabled, the following occurs when users set the date and time through the **Configure Date and Time** dialog box (**Configure** menu):

- If you enable **Periodic Date/Time Synchronization**, an error message displays indicating that Clock Alert Mode must be cleared to enable automatic synchronization of the date and time.
- If you manually set the date and time (**Periodic Date/Time Synchronization** is not enabled), a confirmation dialog box will display. You must click **OK** on that dialog box to continue manual configuration.

- **Host Control Prohibited**

Click this check box to display a check mark and prohibit a host management program from changing configuration and connectivity parameters on the Switch. In this case, the host program will have read authorization only and cannot make changes. When the check mark is not displayed, a host program can change configuration and connectivity parameters on the Switch.

- **Programmed offline state control**

Click this check box to display a check mark and enable a host management program to control the Switch's offline and online state. When a check mark is not displayed, a host program cannot set the Switch online or offline.

- **Active=Saved**

Click this check box to display a check mark and enable the **active=saved** function for the IPL address configuration.

- If **Active=Saved** is enabled (check mark), the IPL and the active address configuration are maintained as identical configurations. If a new configuration is activated through the **Configure Addresses - "Active"** dialog box, that configuration becomes the IPL address configuration.
- If **Active=Saved** is not enabled (no check mark), the IPL address configuration and the active configuration are not maintained as identical, and may be different configurations. If the feature *is not* enabled, you can modify the IPL configuration through the **Configure Addresses - "Active"** dialog box. If the feature *is* enabled, the IPL file is locked to modification through the **Configure Addresses - "Active"** dialog box.

- **Code Page**

Consider the language required for the port name display that displays on the HAFM Server. Language support is provided through character set 697 for all Extended Binary-Coded Decimal Interchange Code (EBCDIC) pages.

When planning the installation, select the EBCDIC code page for displaying host-assigned port names or the CUP name. As an example, if the code page for Italy is selected and a port name is assigned in Italian by the host management program, then the Italian language port name will display in the Product Manager.

This field lists the code pages that are available for configuration. The default code page is United States/Canada 00037. Refer to the following table for other code pages:

**Table 8–1: Available Code Pages**

Code Page Name	Code Page	Hexadecimal CPGID
United States/Canada	00037	0025
Germany/Austria	00273	0111
Brazil	00275	0113
Italy	00280	0118
Japan	00281	0119
Spain/Latin America	00284	011C
United Kingdom	00285	011D
France	00297	0129
International #5	00500	01F4

## Procedure

To configure the FICON management server, use the following steps:

1. Choose **Configure > Management Server** from the **Product Manager** window. The **Configure FICON Management Server** dialog box displays, as shown in [Figure 8–1](#).



**Figure 8–1: Configure FICON Management Server dialog box**

2. Enable or disable the management server by clicking **Enable Management Server** check box. (To disable the management server, click the check box again to remove the check mark.)
3. Enable or disable Switch clock alert mode by clicking the **Director Clock Alert Mode** check box. When a check mark displays, the alert mode is enabled.
4. Allow or prohibit host control by clicking the check box in the **Host Control Prohibited** field. When a check mark displays, host control is prohibited.
5. Allow or prohibit offline state control by clicking the check box in the **Programmed offline state control** field. When a check mark displays, programmed control of the offline state is allowed.
6. Enable or disable Active=Saved mode by clicking the check box in the **Active=Saved** field. When a check mark displays, the Active=Saved mode is enabled.
7. If necessary, choose a code page from the **Code Page** drop-down list.
8. Activate changes and close the dialog box by clicking the **Activate** button.
9. If you are finished configuring the Switch, back up the configuration data.

## Open Systems Management Server

The Open System Management Server (OSMS) is a keyed feature that allows host control and inband management of the Director or Switch through a management application that resides on an open-systems interconnection (OSI) device. This device is attached to a Director or Switch port. The device communicates with the Switch or Director through Fibre Channel common transport (FC-CT) protocol.

## Installation

To install and enable this option, choose the **Configure Feature Key** option on the Product Manager **Configure** menu.

## Configuring the Open Systems Management Server

Use these procedures to configure the open systems inband management program to function with the Switch.

The optional Open Systems Management Server feature must be installed in order to perform this procedure.

### Procedure

To configure open systems management server, use the following steps:

1. Choose **Configure > Management Server** from the **Product Manager** window. The **Configure Open Systems Management Server** dialog box displays, as shown in [Figure 8–2](#).



**Figure 8–2: Configure Open Systems Management Server dialog box**

2. Enable the management server by clicking the **Enable Management Server** check box. (To disable the management server, click the check box again to remove the check mark.)
3. Click the check box in the **Host Control Prohibited** field to display a check mark and to prohibit the host management program from changing configuration and connectivity parameters on the Switch. In this case, the host program has read-only access to configuration and connectivity parameters. Clicking the check box when it contains a check mark removes the check mark and allows a host program to change configuration and connectivity parameters on the Switch.
4. To activate changes and close the dialog box, click **Activate**.
5. If you are finished configuring the Switch, you can back up the configuration data.

## SANtegrity Features

SANtegrity includes a set of features that enhance security in SANs (Storage Area Networks) that contain a large and mixed group of fabrics and attached devices. Through these features you can allow or prohibit Switch attachment to fabrics and device attachment to Switches. These features are enabled by purchasing a feature key, then enabling the key through the **Configure Feature Key** dialog box.

SANtegrity features include:

- Fabric Binding
- Switch Binding

**Enterprise Fabric Mode** — Although this is not a keyed feature, the SANtegrity Fabric Binding and Switch Binding must be installed before you can use the Enterprise Fabric Mode function through the **HAFM Fabrics** menu.

### Fabric Binding

This feature is managed through the **Fabric Binding** option, available through the **Fabrics** menu in HAFM when the **Fabrics** tab is selected. Using Fabric Binding, you can allow specific Switches to attach to specific fabrics in the SAN. This provides security from accidental fabric merges and potential fabric disruption when fabrics become segmented because they cannot merge.

### Enable/Disable and Online State Functions

In order for Fabric Binding to function, specific operating parameters and optional features must be enabled. Also, there are specific requirements for disabling these parameters and features when the Director or Switch is offline or online. Be aware of the following:

- Because Switches are bound to a fabric by World Wide Name (WWN) and domain ID, the Insistent Domain ID option in the **Configure Switch Parameters** dialog box is automatically enabled if Fabric Binding is enabled.
- If Fabric Binding is enabled and the Switch is online, you cannot disable Insistent Domain ID.
- If Fabric Binding is enabled and the Director or Switch is offline, you can disable Insistent Domain ID, but this will disable Fabric Binding.
- You cannot disable Fabric Binding or Switch Binding if Enterprise Fabric Mode is enabled. However, if Enterprise Fabric Mode is disabled, you can disable Fabric Binding, Switch Binding, or both.

## Switch Binding

This feature is managed through the **Switch Binding** submenu options available on the Product Manager **Configure** menu. Using **Switch Binding**, you can specify devices and Switches that can attach to Director and Switch ports. This provides security in environments that include a large number of devices by ensuring that only the intended set of devices attach to a Switch or Director.

### Configuring Switch Binding Overview

To configure Switch binding, you must first activate the feature using the **Switch Binding State Change** dialog box while selecting the type of port where you want to restrict connection (connection policy). Possible selections are E\_Ports, F\_Ports, or all types.

If the Director or Switch is online, activating Switch binding populates the Membership List in the **Switch Binding - Membership List** dialog box (Product Manager) with the following WWNs currently connected to the Director or Switch, depending on the connection policy set in the **State Change** dialog box:

- WWNs of devices connected to F\_Ports (F\_Port connection policy). The WWN is the WWN of the attached device's port.
- WWNs of Switches connected to E\_Ports (E\_Port connection policy). The WWN is the WWN of the attached Switch.
- WWNs of devices connected to F\_Ports and Switches connected to E\_Ports (all-ports connection policy).

#### Notes

- When the Switch Binding feature is first installed and has not been enabled, the Switch Membership List is empty. When you enable Switch Binding, the Membership List is populated with WWNs of devices, Switches, or both that are currently connected to the Switch.
- If the Switch is offline and you activate Switch binding, the Membership List is not automatically populated.
- Edits to the Switch Binding Membership list will be maintained when you enable or disable Switch Binding.

After enabling Switch Binding, you prohibit devices and/or Switches from connecting with Director or Switch ports by removing them from the Membership List in the **Switch Binding Membership List** dialog box. You allow connections by adding them to the Membership List. You can also add detached nodes and Switches.

## Enable/Disable Switch Binding

1. Choose the **Configure > Switch Binding > Change State** from the **Product Manager** window. The **Switch Binding State Change** dialog box displays, as shown in [Figure 8–3](#).



**Figure 8–3: Switch Binding State Change dialog box**

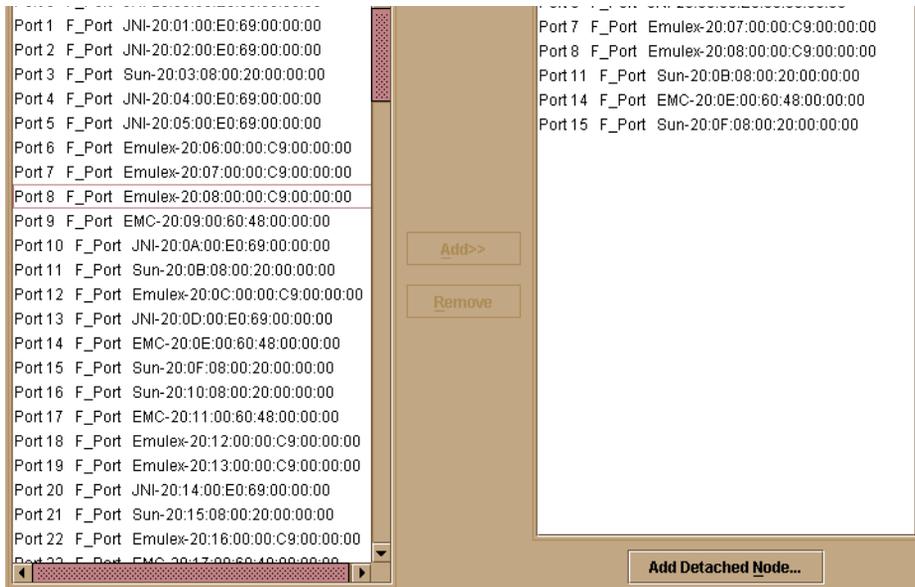
2. Perform one of the following steps:
  - To disable Switch Binding (a check mark displays in the **Enable Switch Binding** check box), click the **Enable Switch Binding** check box to remove the check mark, then click **Activate**.
  - To enable Switch Binding (check mark is not in the **Enable Switch Binding** check box), click the **Enable Switch Binding** check box to add a check mark. Go on to step 3 to set the Connection Policy.
3. Click one of the **Connection Policy** options.
  - **Restrict E\_Ports** — Select if you want to restrict connections from specific Switches to Switch E\_Ports. Switch WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection. Devices are allowed to connect to any F\_Port.
  - **Restrict F\_Ports** — Select if you want to restrict connections from specific devices to Switch F\_Ports. Device WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection. Switches are allowed to connect to any E\_Port.
  - **Restrict All** — Select if you want to restrict connections from specific devices to Switch F\_Ports and Switches to Switch E\_Ports. Device and Switch WWNs can be added to the Switch Membership List to allow connection and removed from the Membership List to prohibit connection.

4. Click **Activate** to enable the changes and close the dialog box.
5. Edit the Switch Membership List through the **Switch Binding Membership List** dialog box to add or remove Switches and devices that are allowed to connect with the Switch.

## Editing the Switch Membership List

1. Choose the **Configure > Switch Binding > Edit Membership List** from the **Product Manager** window. The **Switch Binding Membership List** dialog box displays, as shown in [Figure 8–4](#).

The WWNs of devices and/or Switches that can currently connect to Switch ports are listed in the **Switch Membership List** panel.



**Figure 8–4: Switch Binding Membership List dialog box**

Refer to [Configuring Switch Binding Overview on page 8–7](#) for information on how the Switch Membership List is populated with WWNs according to options set in the **Switch Binding State Change** dialog box.

2. If nicknames are configured for WWNs through HAFM and you want these to display instead of WWNs in this dialog box, click **Display Options**. The **Display Options** dialog box displays.

3. Click **Nickname**, then click **OK**.
4. To prohibit connection to a Switch port from a WWN currently in the Membership List, click the WWN or nickname in the **Membership List**, then click **Remove**. The WWN or nickname will move to the **Node List** panel. WWNs can only be removed from the fabric if any of the following is true:
  - The Switch is offline.
  - Switch Binding is disabled.
  - The Switch or device with the WWN is not connected to the Switch.
  - Switch Binding is not enabled for the same port type as enabled for the Connection Policy in the **Switch Binding State Change** dialog box. For example, a WWN for a Switch attached to an E\_Port can be removed if the Switch Binding Connection Policy was enabled to Restrict F\_Ports.
  - The Switch or device with the WWN is connected to a port that is blocked.
5. The Switch or device with the WWN is not currently connected to the Switch (detached node).
6. WWNs can be added to the **Switch Membership List** (and thereby allowed connection) when Switch Binding is either enabled or disabled. To allow connection to a Switch port from a WWN in the **Node List** panel, select the WWN or nickname in the **Node List** panel, then click the **Add** button. The WWN or nickname will move to the **Membership List** panel.
7. To add a WWN for a device or Switch not currently connected to the Switch, click **Detached Node**. The **Add Detached Node** dialog box displays.
8. Enter the appropriate WWN or nickname (if configured through HAFM) and click **OK**. The WWN or nickname displays in the **Switch Membership List**.
9. Click **Activate** to enable the changes and close the dialog box.

## Enable/Disable and Online State Functions

In order for Switch Binding to function, specific operating parameters and optional features must be enabled. Also, there are specific requirements for disabling these parameters and features when the Director or Switch is offline or online. Be aware of the following:

- Switch Binding can be enabled or disabled whether the Switch is offline or online.
- Enabling Enterprise Fabric Mode automatically enables Switch Binding.

- You cannot disable Switch Binding if Enterprise Fabric Mode is enabled.
- If Enterprise Fabric Mode is enabled and the Director or Switch is online, you cannot disable Switch Binding. However, if Enterprise Fabric Mode is disabled, you can disable Fabric Binding, Switch Binding, or both.
- If Enterprise Fabric Mode is enabled and the Director or Switch is offline you can disable Switch Binding, but Enterprise Fabric Mode will also disable.
- WWNs can be added to the Switch Membership List when Switch Binding is enabled or disabled.
- WWNs can only be removed from the Switch Membership List if any of the following are true:
  - The Director or Switch is offline.
  - Switch Binding is disabled.
  - The Switch or device with the WWN is not connected to the Director or Switch.
  - Switch Binding is not enabled for the same port type as enabled for the Connection Policy in the **Switch Binding State Change** dialog box. For example, a WWN for a Switch attached to an E\_Port can be removed if Switch Binding Connection Policy was enabled to Restrict F\_Ports.
  - The Switch or device with the WWN is connected to a port that is blocked.
  - The Switch or device with the WWN is not currently connected to the Director or Switch (detached node).
- If the Director or Switch is online and Switch Binding is not enabled, all nodes and Switches attached to the Director or Switch are automatically added to the Switch Membership List.

## Zoning with Switch Binding Enabled

Note that SANtegrity has no effect on existing zoning configurations. However, note that if a device WWN is in a specific zone, but the WWN is not in the Switch Membership List, the device cannot log in to the Director or Switch port and cannot connect to other devices in the zone with Switch Binding enabled.

## Enterprise Fabric Mode

**Enterprise Fabric Mode** is an option available on the **Fabrics** menu in the HAFM application if the SANtegrity feature key is installed. This option automatically enables the following features and operating parameters that are necessary in multiswitch Enterprise Fabric environments. Note that there are specific requirements for disabling these parameters and features when the Director or Switch is offline or online.

### Fabric Binding

This is a SANtegrity feature enabled through the **Fabrics** menu in HAFM that allows or prohibits Switches and Directors from merging with a selected fabric. Refer to [Enable/Disable and Online State Functions on page 8-6](#) for details on enabling/disabling Fabric Binding with Enterprise Fabric Mode.

### Switch Binding

This is a SANtegrity feature enabled through the **Configure** menu in the Product Manager that allows or prohibits Switches and/or Directors from connecting to Switch E\_Ports, devices from connecting to F\_Ports. Refer to [Enable/Disable and Online State Functions on page 8-10](#) for details on enabling/disabling Switch Binding with Enterprise Fabric Mode enabled.

### Rerouting Delay

Rerouting delay is a parameter in the **Configure Switch Parameters** dialog box, available from **Configure** menu in the Product Manager application.

Rerouting Delay ensures that frames are delivered through the fabric in order to their destination. If there is a change to the fabric topology that creates a new path (for example, a new Switch is added to the fabric), frames may be routed over this new path if its hop count is less than a previous path with a minimum hop count. This may result in frames being delivered to a destination out of order since frames sent over the new, shorter path may arrive ahead of older frames still in route over the older path. If Rerouting Delay is enabled, traffic ceases in the fabric for the time specified in the **E\_D\_TOV** field of the **Configure Fabric Parameters** dialog box (**Configure** menu). This delay enables frames sent on the old path to exit to their destination before new frames begin traversing the new path.

If Enterprise Fabric Mode is enabled, this option is automatically enabled and cannot be disabled unless the Director or Switch is offline. In this case, disabling Rerouting Delay also disables Enterprise Fabric Mode.

## Domain RSCNs

This is a parameter in the **Configure Switch Parameters** dialog box, available from **Configure** menu in the *Product Manager* application. Domain register for state change notifications (domain RSCNs) are sent between end devices in a fabric to provide additional connection information to host bus adapters (HBA) and storage devices. As an example, this information might be that a logical path has been broken because of a physical event, such as a fiber optic cable being disconnected from a port.

If Enterprise Fabric Mode is enabled, this parameter is automatically enabled and cannot be disabled unless the Director or Switch is offline. In this case, disabling Domain RSCNs also disables Enterprise Fabric Mode.

## Insistent Domain Identification (ID)

This is a parameter in the **Configure Switch Parameters** dialog box, available from **Configure** menu in the *Product Manager* application. Enabling this option sets the domain ID configured in the **Preferred Domain ID** field in the **Configure Switch Parameters** dialog box as the active domain identification when the fabric initializes. A static and unique domain identification is required by the Fabric Binding feature because the feature's Fabric Membership list identifies Switches by WWN and Domain ID. If a duplicate preferred domain ID is used, then insisted, warnings occur when Directors and Switches are added to a Fabric Membership List.

If Fabric Binding or Enterprise Fabric Mode is enabled, this option is automatically enabled and cannot be disabled unless these options are disabled when the Director or Switch is offline. If the Director or Switch is online, disabling Insistent Domain ID will disable Enterprise Fabric Mode and Fabric Binding.



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## Information and Error Messages

This appendix describes messages that may appear as you use the High Availability Fabric Manager. A description and action are provided for each message, which is listed in alphabetical order.

**Table A-1: High Availability Fabric Manager Messages**

Message	Description	Action
A zone must have at least one zone member.	When creating a new zone, one or more zone members must be added.	Add one or more zone members to the new zone.
A zone set must have at least one zone.	When creating a new zone set, one or more zones must be added.	Add one or more zones to the new zone set using the <b>Modify Zone Set</b> dialog box.
All alias, zone, and zone set names must be unique.	When creating a new alias, zone, or zone set the name must be unique.	Choose a unique name for the new alias, zone, or zone set.
All zone members are logged.	Attempt was made to display all zone members not logged in using the <b>Zone Set</b> tab, but all members are currently logged in.	Informational message.
Are you sure you want to delete this network address?	The currently selected network address will be deleted.	Click <b>Yes</b> to delete or <b>No</b> to cancel.
Are you sure you want to delete this nickname?	The selected nickname will be deleted from the list of nickname definitions.	Click <b>Yes</b> to delete the nickname or <b>No</b> to cancel the operation.

Message	Description	Action
Are you sure you want to delete this product?	The selected product will be deleted from the list of product definitions.	Click <b>Yes</b> to delete the product or <b>No</b> to cancel the operation.
Are you sure you want to delete this user?	The selected user will be deleted from the list of user definitions.	Click <b>Yes</b> to delete the user or <b>No</b> to cancel the operation.
Are you sure you want to delete this zone?	Requesting confirmation to delete the specified zone.	Click <b>Yes</b> to confirm the deletion of the zone or <b>No</b> to cancel the operation.
Are you sure you want to overwrite this zone set?	The selected zone set will be overwritten in the zoning library.	Click <b>Yes</b> to overwrite or <b>No</b> to cancel.
Are you sure you want to remove all members from this zone?	All members will be deleted from the selected zone.	Click <b>Yes</b> to delete the members or <b>No</b> to cancel the operation.
Cannot add a switch to a zone.	The device that you are attempting to add to the zone is a Switch, which cannot be added to a zone.	Specify the port number or corresponding World Wide Name for the device you want to add to the zone.
Cannot connect to HAFM server.	The <i>HAFM</i> application at a remote workstation could not connect to the HAFM server.	Verify the HAFM server internet protocol (IP) address is valid.
Cannot delete product.	The selected product cannot be deleted.	Verify the HAFM server-to-product link is up. <ul style="list-style-type: none"> <li>• If the link is up, the HAFM server may be busy.</li> <li>• Another Product Manager instance may be open.</li> <li>• The user may not have permission to delete the product.</li> </ul>

Message	Description	Action
Cannot disable Fabric Binding while Enterprise Fabric Mode is active.	You attempted to disable Fabric Binding through the <b>Fabric Binding</b> dialog box, but Enterprise Fabric Mode was enabled.	Disable Enterprise Fabric Mode through the <b>Enterprise Fabric Mode</b> dialog box in HAFM before disabling Fabric Binding.
Cannot display route on a one switch fabric.	You cannot show routes between end devices in a fabric when configuring Show Routes ( <b>Fabrics</b> menu).	Error displays when attempting to show routes on a fabric with only one Switch. Configure the Show Route option on a multiswitch fabric.
Cannot display route. All switches in route must be managed by the same server.	You cannot show the route between devices that are attached to Switches or Directors managed by a different HAFM server.	Make sure devices named in <b>Show Routes</b> dialog box are attached to products managed by this HAFM server.
Cannot display route. All switches in route must support routing.	You cannot show the route through a fabric that has Switches or Directors which do not support routing.	The route must contain only Edge Switch 2/16, Edge Switch 2/32 Switches or Director 2/64 directors.
Cannot display route. Device is not a member of a zone in the active zone set.	You cannot show the route for a device that is not a member of a zone in the active zone set. The source node that you have selected is not part of a zone in the active zone set.	Enable the default zone or activate the zone for the device before attempting to show the route.
Cannot display route. Error 9.	An internal error has occurred while you were trying to view routes.	Contact the next level of support to report the problem.
Cannot display route. No active zone enabled.	You cannot show the route through a fabric with no active zone.	Enable the default zone or activate a zone set before attempting to show the route.

Message	Description	Action
Cannot have spaces in field.	Spaces are not allowed as part of the entry for this field.	Delete spaces from the field entry.
Cannot modify a zone set with an invalid name. Rename zone set and try again.	A zone set must have a valid name to be modified.	Assign a valid name to the zone set, then you can modify through the <b>Modify Zone Set</b> dialog box.
Cannot modify a zone with an invalid name. Rename zone and try again.	Zone does not have a valid name.	Rename zone, then use <b>Modify Zone</b> dialog box to modify zone.
Cannot modify product.	The selected product cannot be modified.	<p>Verify the HAFM server-to-product link is up.</p> <ul style="list-style-type: none"> <li>• If the link is up, the HAFM server may be busy.</li> <li>• Another Product Manager instance may be open.</li> <li>• The user may not have permission to modify the product.</li> </ul>
Cannot perform operation. Fabric is unknown.	This message displays if no Switches in the fabric are connected to the HAFM server.	Ensure at least one fabric-attached Switch or Director has an Ethernet connection to the HAFM server and retry the operation.
Cannot perform operation. The list of attached nodes is unavailable.	This message displays when attached nodes are unavailable and the user attempts to modify a zone or create a new zone.	Verify an attached node is available and retry the operation.

Message	Description	Action
Cannot retrieve current SNMP configuration.	The current SNMP configuration could not be retrieved.	Try again. If the problem persists, contact the next level of support.
Cannot save SNMP configuration.	The current SNMP configuration could not be saved.	Try again. If the problem persists, contact the next level of support.
Cannot set write authorization without defining a community name.	An SNMP community name has not been configured.	Enter a valid community name in the <b>Configure SNMP</b> dialog box.
Cannot show zoning library. No fabric exists.	You cannot show the zoning library if no fabric exists. You must have identified a Switch or Director to the HAFM for a fabric to exist.	Identify an existing Switch or Director to the HAFM using the <b>New Product</b> dialog box.
Click OK to remove all contents from log.	This action deletes all contents from the selected log.	Click <b>OK</b> to delete the log contents or <b>Cancel</b> to cancel the operation.
Connection to HAFM server lost. Click OK to exit application.	The <i>HAFM</i> application at a remote workstation lost the network connection to the HAFM server.	Re-start the <i>HAFM</i> application to connect to the HAFM server.
Connection to HAFM server lost.	The connection to the remote HAFM server has been lost.	Log in to the HAFM server again through the HAFM <b>Login</b> dialog box.
Could not export log to file.	A log file input/output (I/O) error occurred and the file could not be saved to the specified destination. The disk may be full or write protected.	If the disk is full, use another disk. If the disk is write protected, change the write-protect properties or use another disk.

Message	Description	Action
Default zoning is not supported in Open Fabric Mode.	A default zone cannot be enabled when the product is enabled for Open Fabric mode. Open Fabric mode does not support zone members defined by port numbers.	Change the interop mode from Open Fabric mode to Homogeneous Fabric mode through the <b>Configure Operating Mode</b> dialog box in the <i>Product Manager</i> application. Or, redefine zone members by the WWN of attached devices.
Device is not a member of a zone in the active zone set.	The selected device is not a member of a zone in the active zone set and therefore cannot communicate with the other device in the route.	Enable the default zone or activate a zone set containing the member before attempting to show the route.
Download complete. Click OK and restart the HAFM.	Download of the <i>HAFM</i> and <i>Product Manager</i> applications is complete.	Restart the <i>HAFM</i> application to continue.
Duplicate community names require identical write authorizations.	If configuring two communities with identical names, they must also have identical write authorizations.	Verify that both communities with the same name have the same write authorizations.
Duplicate Fabric Name.	The fabric name that you have specified already exists.	Choose another name for the fabric.
Duplicate name in zoning configuration. All zone and zone set names must be unique.	Every name in the zoning library must be unique.	Modify (to make it unique) or delete the duplicate name.
Duplicate nickname in nickname configuration.	Duplicate nicknames cannot be configured.	Modify the selected nickname to make it unique.

Message	Description	Action
Duplicate World-Wide Name in nickname configuration.	A World Wide Name can be associated with only one nickname.	Modify (to make it unique) or delete the selected World Wide Name.
Duplicate zone in zone set configuration.	More than one instance of a zone is defined in a zone set.	Delete one of the duplicate zones from the zone set.
Duplicate zone member in zone configuration.	More than one instance of a zone member is defined in a zone.	Delete one of the duplicate zone members from the zone.
Enterprise Fabric feature not installed. Please contact your sales representative	User selected Fabric Binding or Enterprise Fabric Mode from the Fabrics menu, but the SANtegrity feature was not installed.	Install the SANtegrity feature to use Fabric Binding or enable Enterprise Fabric Mode.
HAFM Management session is already active from this workstation.	A HAFM session already exists on the current workstation.	A workstation can have only one active HAFM session.
HAFM error < error number 1 through 8 >.	The <i>HAFM</i> application encountered an internal error (1 through 8 inclusive) and cannot continue operation.	Contact the next level of support to report the problem.
HAFM server could not log you on. Verify your username and password.	The incorrect user name and password (both case sensitive) were used while attempting to login to the <i>HAFM</i> application	Verify the user name and password with the customer's network administrator and retry the operation.
HAFM server is shutting down. Connection will be terminated.	The <i>HAFM</i> application is closing and terminating communication with the attached product.	Reboot the HAFM server. If the problem persists, contact the next level of support.

Message	Description	Action
Enabling this zone set will replace the currently active zone set. Do you want to continue?	Only one zone set can be active. By enabling the selected zone set, the current active zone set will be replaced.	Click <b>OK</b> to continue or <b>Cancel</b> to end the operation.
Error creating zone set.	The <i>HAFM</i> application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error creating zone.	The <i>HAFM</i> application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error deleting zone set.	The <i>HAFM</i> application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error deleting zone.	The <i>HAFM</i> application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error reading log file.	The <i>HAFM</i> application encountered an error while trying to read the log.	Try the operation again. If the problem persists, contact the next level of support.
Error removing zone or zone member.	The <i>HAFM</i> application encountered an internal error.	Try the operation again. If the problem persists, contact the next level of support.
Error transferring files < message >.	An error occurred while transferring files from the PC hard drive to the <i>HAFM</i> application. The message varies, depending on the problem.	Try the file transfer operation again. If the problem persists, contact the next level of support.

Message	Description	Action
Fabric Log will be lost once the fabric unpersists. Do you want to continue?	When you unpersist a fabric, the corresponding fabric log is deleted.	Click <b>Yes</b> to unpersist the fabric or <b>No</b> to cancel the operation.
Fabric not persisted.	The user attempted to refresh or clear the <b>Log</b> dialog, after a fabric was unpersisted. When you unpersist a fabric, the corresponding fabric log is deleted.	Clear the log dialog after the fabric is unpersisted.
Field cannot be blank.	The data field requires an entry and cannot be left blank.	Enter appropriate information in the data field.
Field has exceeded maximum number of characters.	The maximum number of data entry characters allowed in the field was exceeded.	Enter the information using the proscribed number of characters.
File transfer aborted.	The user aborted the file transfer process.	Verify the file transfer is to be aborted, then click <b>OK</b> to continue.
Invalid character in field.	An invalid character was entered in the data field.	Remove invalid characters from the entry.
Invalid name.	One of the following invalid names was used: CON, AUX, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, NUL, or PRN.	Choose a valid name and retry the operation.
Invalid network address.	The IP address specified for the product is unknown to the domain name server (invalid).	Verify and enter a valid product IP address.

Message	Description	Action
<p>Invalid port number. Valid ports are (0-&lt; nn &gt;).</p>	<p>You have specified an invalid port number.</p>	<p>Specify a valid port number, in the range 0 to the maximum number of ports on the product minus 1. For example, for a Switch with 32 ports, the valid port range is 0–31</p>
<p>Invalid product selection.</p>	<p>At the New Product dialog box, an invalid product was selected.</p>	<p>Choose a valid product and retry the operation.</p>
<p>Invalid request.</p>	<p>Three conditions result in this message:</p> <ul style="list-style-type: none"> <li>• The user tried to add or modify a product from product view and the network address is already in use. (Network addresses must be unique.)</li> <li>• The user tried to create a new user with a user name that already exists. (User names must be unique.)</li> <li>• The user tried to delete default Administrator user. (The default Administrator user cannot be deleted.)</li> </ul>	<p>Choose the action that is appropriate to the activity that caused the error:</p> <ul style="list-style-type: none"> <li>• Network address: Specify a unique network address for the product.</li> <li>• User name: Specify a unique user name for the new user ID.</li> <li>• Do not delete the default Administrator user.</li> </ul>
<p>Invalid UDP port number.</p>	<p>The specified user datagram protocol (UDP) port number is invalid. The number must be an integer from 1 through 65535 inclusive.</p>	<p>Verify and enter a valid UDP port number.</p>

Message	Description	Action
Invalid World Wide Name or nickname.	The World Wide Name or nickname that you have specified is invalid. The valid format for the World Wide Name is eight two-digit hexadecimal numbers separated by colons (xx:xx:xx:xx:xx:xx:xx:xx). The valid format for a nickname is non blank characters, up to 32 characters.	Try the operation again using a valid World Wide Name or nickname.
Invalid World-Wide Name. Valid WWN format is: xx:xx:xx:xx:xx:xx:xx:xx.	The specified World Wide Name format is invalid. The valid format is eight two-digit hexadecimal numbers separated by colons (xx:xx:xx:xx:xx:xx:xx:xx).	Enter a World Wide Name using the correct format.
Invalid zone in zone set.	The defined zone no longer exists and is invalid.	Use a valid zone when creating the zone set.
Limit exceeded.	You cannot add a new product or user to the <i>HAFM</i> if the maximum number of that resource already exists on the system.	Delete unneeded products or users from the system, before attempting to add any new ones.
No address selected.	You cannot complete the operation because an address has not been selected.	Choose an address and retry the operation.
No attached nodes selected.	An operation was attempted without an attached node selected.	Choose an attached node and try the operation again.
No HAFM server specified.	An HAFM server is not defined to the <i>HAFM</i> application.	At the HAFM <b>Login</b> screen, type a server name in the <b>HAFM Server</b> field and click the <b>Login</b> button.

<b>Message</b>	<b>Description</b>	<b>Action</b>
No nickname selected.	No nickname was selected when the command was attempted.	Choose a nickname and try again.
No Product Managers installed.	No Director or Switch <i>Product Manager</i> application is installed on this workstation.	Install the appropriate Product Manager to this workstation.
No routing information available.	No information is available for the route selected.	Choose a different route and try the operation again.
No user selected.	No user was selected when the command was attempted.	Choose a user and try again.
No zone member selected.	A zoning operation was attempted without a zone member selected.	Choose a zone member and try the operation again.
No zone selected or zone no longer exists.	A zoning operation was attempted without a zone selected, or the zone selected no longer exists in the fabric.	Choose a zone or use a valid zone and try the operation again.
No zone selected or zone no longer exists.	A zoning operation was attempted without a zone selected, or the zone selected no longer exists in the fabric.	Choose a zone or use a valid zone and try the operation again.
No zone selected.	A zoning operation was attempted without a zone selected.	Choose a zone and try the operation again.
No zone set active.	A zone set cannot be deactivated if there are no active zones.	Informational message only - no action is required.
No zone set selected or zone set no longer exists.	A zoning operation was attempted without a zone set selected, or the zone set you selected no longer exists in the fabric.	Choose a zone set and try the operation again.

Message	Description	Action
No zone set selected.	A zoning operation was attempted without a zone set selected.	Choose a zone set and try the operation again.
Only attached nodes can be displayed in this mode.	Users cannot display unused ports when adding ports by World Wide Name.	Change the add criteria to <b>Add by Port</b> .
Password and confirmation don't match.	Entries in the password field and confirmation password field do not match. The entries are case sensitive and must be the same.	Enter the password and confirmation password again.
Product Manager instance is currently open.	A product cannot be deleted while an instance of the <i>Product Manager</i> application is open for the same product.	Close the <i>Product Manager</i> application, then delete the product.
Remote session support has been disabled.	The connection between the specified remote workstation and the HAFM server was disallowed.	Consult with the customer's network administrator to determine if the workstation entry should be modified at the <b>Configure Sessions</b> dialog box.
Remote sessions are not allowed from this network address.	Only IP addresses of remote workstations specified at the <b>Configure Sessions</b> dialog box are allowed to connect to the HAFM server.	Consult with the customer's network administrator to determine if the IP address is to be configured for remote sessions.
Resource is unavailable.	The specified operation cannot be performed because the product is unavailable.	Verify the HAFM server-to-product link is up. If the link is up, the HAFM server may be busy. Try the operation again later.

Message	Description	Action
Selection is not a World Wide Name.	The selection made is not a World Wide Name.	Choose a valid World Wide Name before performing this operation.
Server shutting down.	The <i>HAFM</i> application is closing and terminating communication with the attached product.	Reboot the HAFM server. If the problem persists, contact the next level of support.
SNMP trap address not defined.	If an SNMP community name is defined, a corresponding SNMP trap recipient address must also be defined.	Enter a corresponding SNMP trap recipient address.
The Administrator user cannot be deleted.	The administrator user is permanent and cannot be deleted from the <b>Configure Users</b> dialog box.	Informational message only - no action is required.
The Domain ID was not accepted. The World Wide Name and Domain ID must be unique in the Fabric Membership List.	User attempted to add a detached Switch to the Fabric Membership List through the Fabric Binding option (SANtegrity feature), but a Switch already exists in the fabric with the same domain ID.	Enter a unique domain ID for the Switch in the <b>Add Detached Switch</b> dialog box.
The HAFM server is busy processing a request from another Product Manager.	The HAFM server PC is processing a request from another instance of a <i>Product Manager</i> application, and cannot perform the requested operation.	Wait until the process is completes, then perform the operation again.
The link to the managed product is not available.	The Ethernet connection between the HAFM server and the managed product is down or unavailable.	Establish and verify the network connection.

Message	Description	Action
The maximum number of open products has already been reached.	The maximum number of open products allowed was reached.	Close a Product Manager session (existing open product) before opening a new session.
The maximum number of products has already been configured.	The number of managed products (48) that can be defined to the <i>HAFM</i> application was reached.	Delete an existing product before adding a new product.
The maximum number of products of this type has already been configured.	The number of products of this type (48) that can be defined to the <i>HAFM</i> application was reached.	Delete an existing product of this type before adding a new product.
The maximum number of remote network addresses has already been configured.	A maximum of four IP addresses for remote workstations can be configured at the <b>Session Options</b> dialog box. That number was reached.	Delete an existing IP address before adding a new IP address.
The maximum number of members has already been configured.	The maximum number of unique members is 4097. The maximum number of members is 8192.	Delete members that are no longer needed to allow new members to be configured.
The maximum number of users has already been configured.	The number of users (16) that can be defined to the <i>HAFM</i> application was reached.	Delete an existing user before adding a new user.
The maximum number of zone sets has already been configured.	The maximum number of zone sets that can be defined to the <i>HAFM</i> application was reached.	Delete an existing zone set before adding a new zone set.
The maximum number of zones allowed has already been configured.	The maximum number of zones that can be defined to the <i>HAFM</i> application was reached.	Delete an existing zone before adding a new zone.

Message	Description	Action
The maximum number of zones per zone set has already been configured.	The maximum number of zones that can be defined in a zone set to the <i>HAFM</i> application was reached.	Delete an existing zone before adding a new zone to the zone set.
The nickname does not exist.	The entered nickname does not exist in the fabric.	Configure the nickname to the appropriate product or choose an existing nickname.
The nickname is already assigned. Either use a different name or do not save the name as a nickname.	The entered nickname already exists in the fabric. Each nickname must be unique.	Define a different nickname.
The software version on this HAFM server is not compatible with the version on the remote HAFM server.	A second HAFM server PC (client) connecting to the HAFM server must be running the same software version to log in.	Upgrade the software version on the downlevel HAFM server PC.
This Worldwide Name was not accepted. The World Wide Name and Domain ID must be unique in the Fabric Membership List.	User attempted to add a detached Switch to the Fabric Membership List through the Fabric Binding option (SANtegrity feature), but an entry already exists in the Fabric Membership List with the same World Wide Name (WWN).	Enter a unique World Wide Name for the Switch in the <b>Add Detached Switch</b> dialog box.
The zoning library conversion must be completed before continuing.	The zoning library conversion is incomplete and the requested operation cannot continue.	Complete the zoning library conversion, then retry the operation.
This fabric log is no longer valid because the fabric has been unpersisted.	The selected fabric log is no longer available because the fabric has been unpersisted.	To start a new log for the fabric, persist the fabric through the <b>Persist Fabric</b> dialog box.

Message	Description	Action
This network address has already been assigned.	The specified IP address was assigned and configured. A unique address must be assigned.	Consult with the customer's network administrator to determine a new IP address to be assigned and configured.
This product is not managed by this HAFM server.	The product selected is not managed by this HAFM server.	Choose a product managed by this HAFM server or go to the HAFM server that manages the affected product.
This switch is currently part of this fabric and cannot be removed from the Fabric Membership List. Isolate the switch from the fabric prior to removing it from the Fabric Membership List.	User attempted to remove a Switch from the Fabric Membership List using the Fabric Binding option, but the Switch is still part of the fabric.	Remove the Switch from the fabric by setting the Switch offline or blocking the E_Port where the Switch is connected.
This user name has already been assigned.	The specified user name is already assigned and configured.	Modify (to make it unique) or delete the duplicate name.
Too many members defined.	The maximum number of zone members that can be defined to the <i>HAFM</i> application was reached.	Delete an existing zone member before adding a new zone member.
You do not have rights to perform this action.	Configured user rights do not allow this operation to be performed.	Verify user rights with the customer's network administrator and change as required using the <b>Configure Users</b> dialog box.

Message	Description	Action
You must define an SMTP server address.	A simple mail transfer protocol (SMTP) server address must be defined and configured for e-mail to be activated.	Define the SMTP server address at the <b>Configure E-Mail</b> dialog box.
You must define at least one E-mail address.	At least one e-mail address must be defined and configured for e-mail to be activated.	Define an e-mail address at the <b>Configure E-Mail</b> dialog box.
You must define at least one remote network address.	At least one IP address for a remote workstation must be configured for a remote session to be activated.	Define an IP address for at least one remote workstation at the <b>Configure Sessions</b> dialog box.
You must download the HAFM client via the web install to continue.	An attempt was made to download the <i>HAFM</i> application to a remote workstation (client) using an improper procedure.	Download a compatible version of the <i>HAFM</i> application to the remote workstation (client) using the web install procedure.
Zones configured with port numbers are ignored in Open Fabric Mode.	While in Open Fabric mode, zones configured using port numbers are enforced through World Wide Name.	Informational message only - no action is required.
Zones must be defined before creating a zone set.	You cannot create a zone set without any zones defined for the HAFM.	Define zones using the <b>New Zone</b> dialog box.
Zoning by port number is not supported in Open Fabric Mode.	You cannot specify an item for zoning by port number if the HAFM is in Open Fabric Mode.	Either define zones by WWN of device or change to Homogeneous Fabric mode in the <b>Configure Operation Mode</b> dialog box of <i>Product Manager</i> application.
Zoning name already exists.	Duplicate zone names are not allowed in the zoning library.	Modify (to make it unique) or delete the duplicate zone name.

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## Configuring Remote Workstations: Windows Systems

This section describes the procedures for installing the high availability fabric manager on a remote workstation running Windows 95, Windows 98, Windows 2000, or Windows XP. To run the High Availability Fabric Manager on a remote workstation, you must first download and install the *High Availability Fabric Manager* application from the HAFM server.

The figures in this chapter show Netscape Navigator as the Internet browser; however, it is acceptable to use Microsoft Internet Explorer during these procedures.

### Requirements

The download and installation process requires the use of a personal computer (PC) with the following minimum system requirements:

- Operating system (one of the following):
  - Windows 95
  - Windows 98
  - Windows 2000
  - Windows NT
  - Windows XP
- 400 megahertz (MHz) Pentium processor.
- 128 megabyte (MB) random access memory (RAM) memory.
- 28 MB available disk space.
- Video card supporting 256 colors at 800 x 600 resolution.
- Ethernet network adapter.

- Java-enabled Internet browser, such as Microsoft Internet Explorer (version 3.0 or later) or Netscape Navigator (version 3.0 or later).

Newer versions of the High Availability Fabric Manager or Product Managers installed on the HAFM server will automatically download when the remote clients log in to the server.

## Procedure

To install the High Availability Fabric Manager on a remote workstation:

1. Open a World Wide Web (WWW) browser.
2. Type the address of the HAFM server in the **Location** (or **Address**) box on the browser, then press **Enter**.

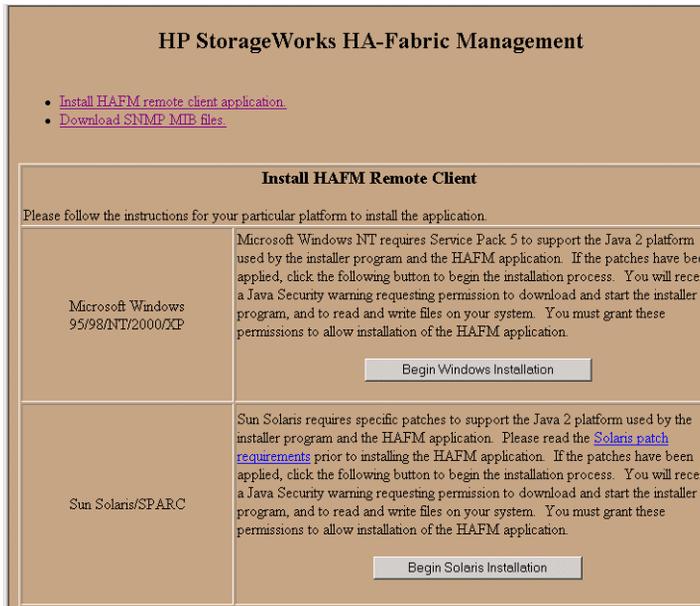
For example;

```
http://HAFMserver
```

where “HAFMserver” is the network address of the HAFM server.

Obtain the HAFM server address from your network administrator

The **HP StorageWorks HAFM remote client installation** screen displays. [Figure B-1 on page B-3](#) shows the upper portion of this page.



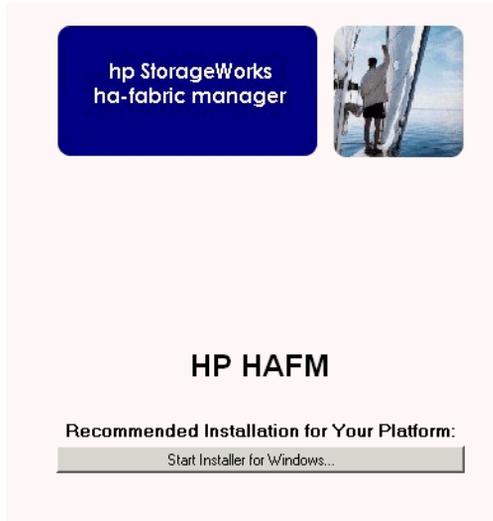
**Figure B-1: Remote Client Installation screen**

1. On the page, click **Begin Windows Installation** to begin the installation process. A security warning page prompts you to install the InstallAnywhere Web Installer (Figure B-2).



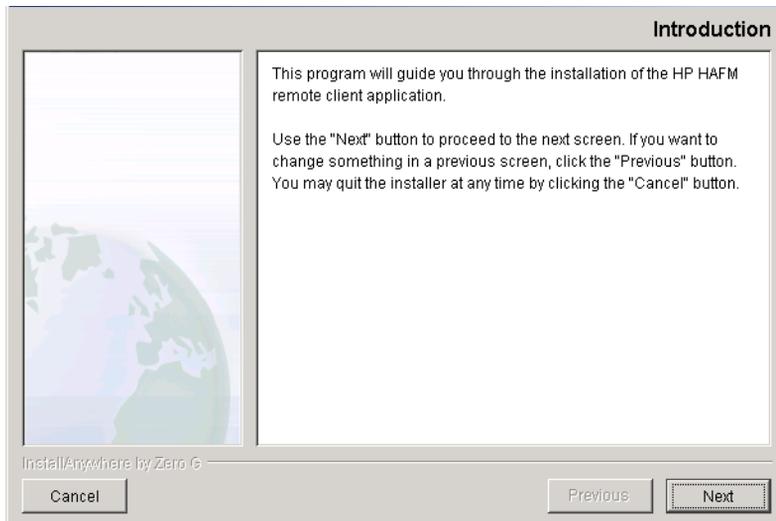
**Figure B-2: Security Warning page**

2. If you have read the security agreement information and wish to continue, click **Yes**. The **HP High Availability Fabric Manager (HAFM) InstallAnywhere Web Installer** page displays. [Figure B-3](#) illustrates a portion of this page.



**Figure B-3: InstallAnywhere Web Installer page**

3. On the **InstallAnywhere Web Installer** page, click **Start Installer for Windows**. The system begins downloading the High Availability Fabric Manager installer. When the download is complete, the **Introduction** screen displays ([Figure B-4 on page B-5](#)).

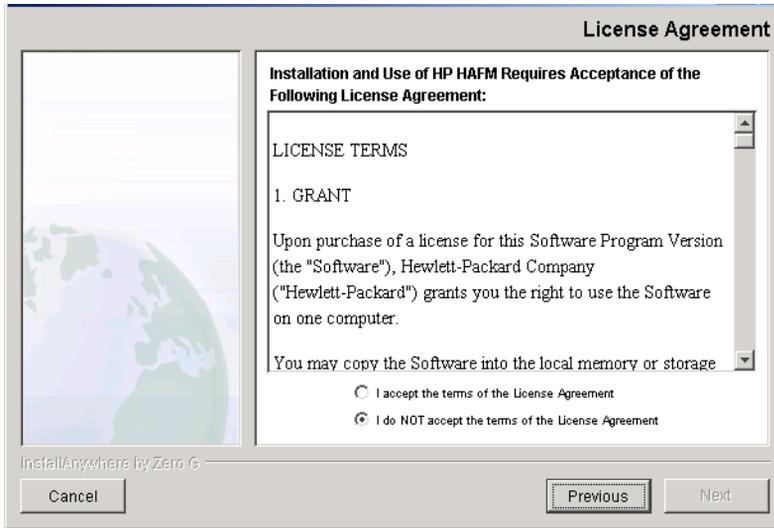


**Figure B–4: High Availability Fabric Manager Installer — Introduction screen**

4. Click **Next**.

At any time, you may return to the previous page by clicking **Previous** or quit the Installer by clicking **Exit**.

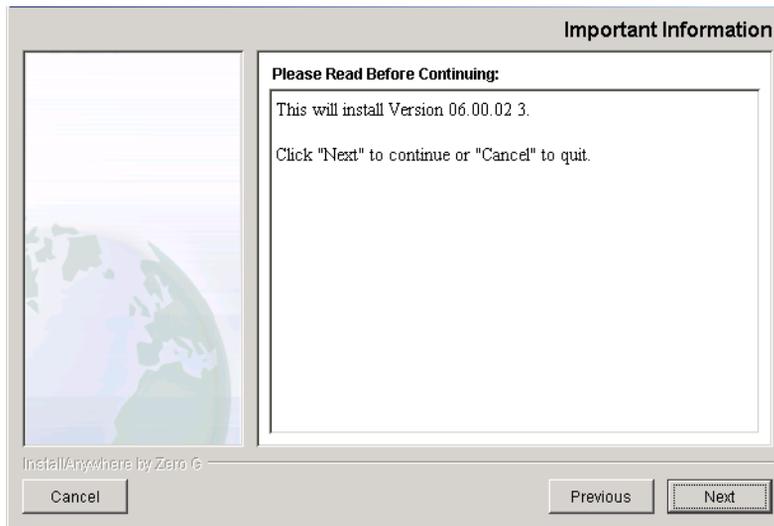
The **License Agreement** screen displays ([Figure B–5 on page B-6](#)).



**Figure B-5: High Availability Fabric Manager Installer — License Agreement**

5. If you have read the license agreement and agree to accept the terms, click **I accept the terms of the License Agreement**. Click **Next**.

The **Important Information** screen displays ([Figure B-6](#)).



**Figure B-6: High Availability Fabric Manager Installer — Important Information**

6. Click **Next**.

The **Choose Install Folder** screen displays (Figure B-7).

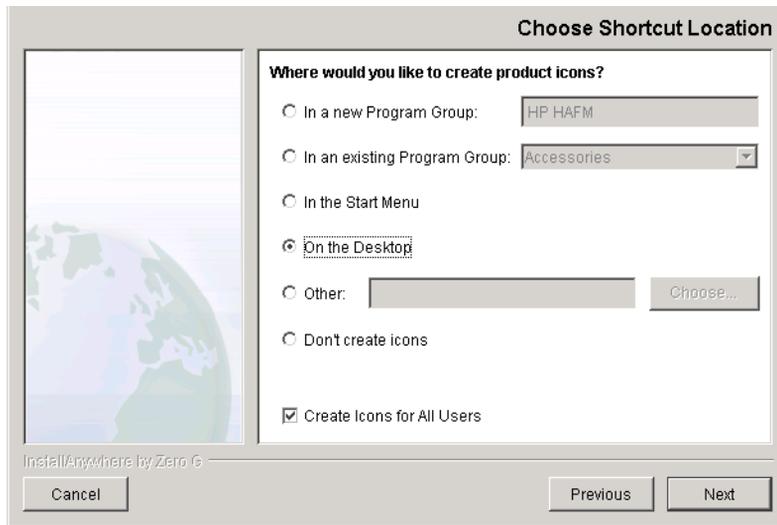


**Figure B-7: High Availability Fabric Manager Installer — Choose Install Folder**

7. Select a folder on the remote workstation in which to store the HAFM software. You can accept the default location, type in the path to a new location, or click **Choose** to browse for an appropriate location. Click **Restore Default Folder** to change the location back to the default folder.
8. Click **Next**.

If the High Availability Fabric Manager is already installed on the system, you will be prompted to uninstall the existing version. If you want to uninstall the existing software, click the **Yes** radio button and press **Next**. When the **Uninstall HAFM** window displays, click **Uninstall**. When the **Uninstall Complete** screen displays, click **Quit**.

The **Choose Shortcut Location** screen displays (Figure B-8 on page B-8).



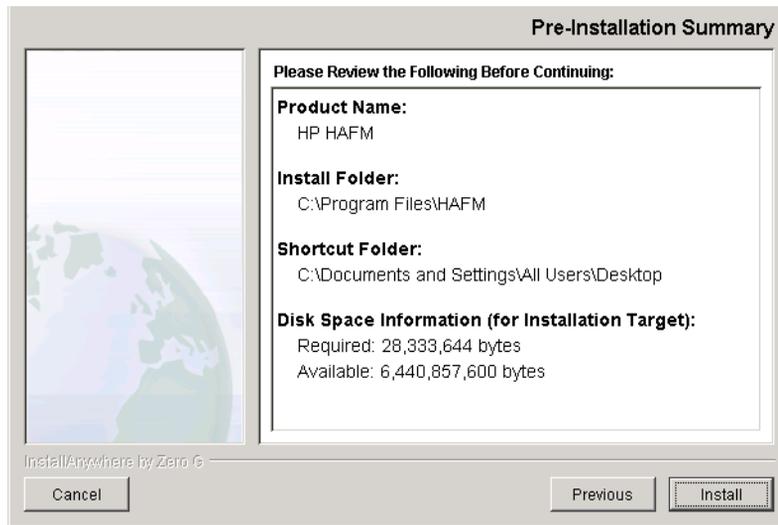
**Figure B–8: High Availability Fabric Manager Installer — Choose Shortcut Location**

9. Select a shortcut location. The options for the location of High Availability Fabric Manager icons are:
  - **In a new Program Group**—Adds a new program group on the **Start** menu for the High Availability Fabric Manager.
  - **In an existing Program Group**—Enables you to choose from existing program groups on the **Start** menu for the High Availability Fabric Manager.
  - **In the Start Menu**—Puts the **High Availability Fabric Manager** icon on the initial **Start** menu.
  - **On the Desktop**—Puts the High Availability Fabric Manager icons on the Windows desktop.
  - **Other**—Enables you to choose any location on your hard drive or network for the High Availability Fabric Manager files.
  - **Don't create icons**—Prevents the installation from creating an icon for the High Availability Fabric Manager.

The **Create Icons for All Users** check box can be enabled for some of the shortcut options but not all. If the check box is enabled, the appropriate High Availability Fabric Manager icons are placed on the desktop and in the Programs folder of every Windows user. If the check box is cleared, the icons are created only for the current user and are not visible for other user IDs.

10. Click **Next** to begin the installation.

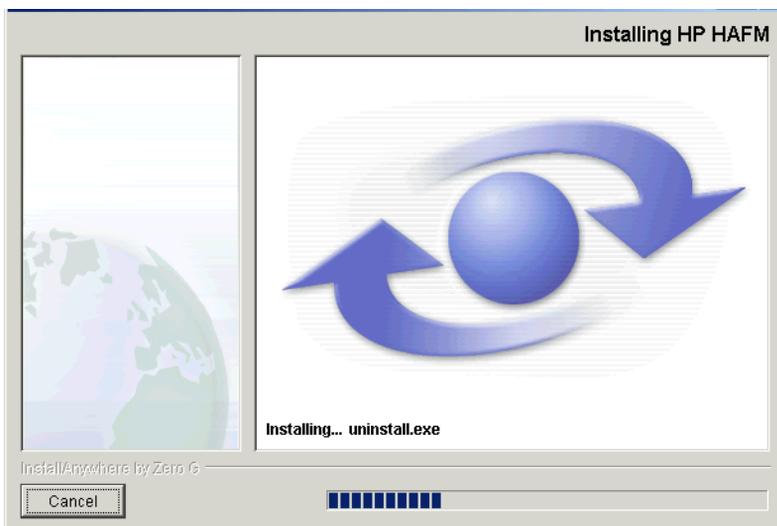
The **Pre-Installation Summary** screen displays (Figure B-9).



**Figure B-9: High Availability Fabric Manager Installer — Pre-Installation Summary**

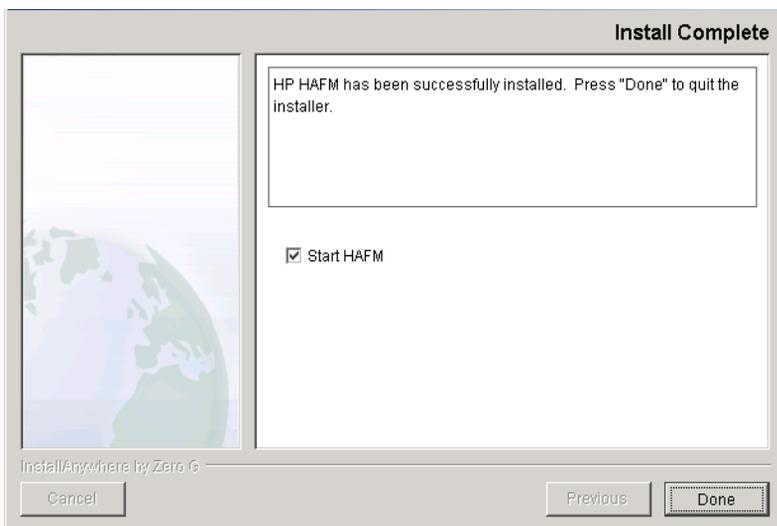
11. Review the installation information and click **Install**.

The progress of the installation is tracked on the **Installing HP StorageWorks HAFM** screen (Figure B-10).



**Figure B-10: Installing HP HAFM**

12. When complete, the following screen displays (Figure B-11). Click **Done** to close the **Install Complete** dialog box.



**Figure B-11: High Availability Fabric Manager Installer — Install Complete**

## Running the High Availability Fabric Manager

1. If you chose icons to be created in step 9 of the installation procedure, access the icon installed in the windows **Start** menu or desktop to run HAFM.
2. If you did not create any icons in step 9 of the installation procedure, right -lick the **My Computer** icon and choose **Exploring**. In the **Exploring** window, browse to the directory in which you saved the High Availability Fabric Manager program (the default is a subdirectory named HAFM in your home directory).
3. Double-click the High Availability Fabric Manager icon to run the High Availability Fabric Manager program.



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## Configuring Remote Workstations: Solaris Systems

This section describes the procedures for installing the High Availability Fabric Manager on a remote Solaris workstation. To run the High Availability Fabric Manager on a remote workstation, you must first download and install the *High Availability Fabric Manager* application from the HAFM server.

The figures in this chapter show Netscape Navigator as the Internet browser; however, it is acceptable to use Microsoft Internet Explorer during these procedures.

### Requirements

The download and installation process requires the use of a workstation with the following minimum system requirements:

- Operating systems (one of the following):
  - SunOS version 5.5.1 or higher
  - Solaris version 2.5.1 or higher
- 400 megahertz (MHz) UltraSPARC-II processor.
- 128 megabyte (MB) random access memory (RAM) memory.
- 60 MB available disk space.
- Video card supporting 256 colors at 800 x 600 resolution.
- Network connection.
- Internet browser, such as Microsoft Internet Explorer (version 3.0 or later) or Netscape Navigator (version 3.0 or later).

Newer versions of the High Availability Fabric Manager or Product Managers installed on the HAFM server will automatically download when the remote clients log in to the Server.

## Procedure

To install the High Availability Fabric Manager on a remote workstation:

1. Open a World Wide Web (WWW) browser.
2. Type the address of the HAFM server in the **Location** (or **Address**) field of the browser, then press **Enter**.

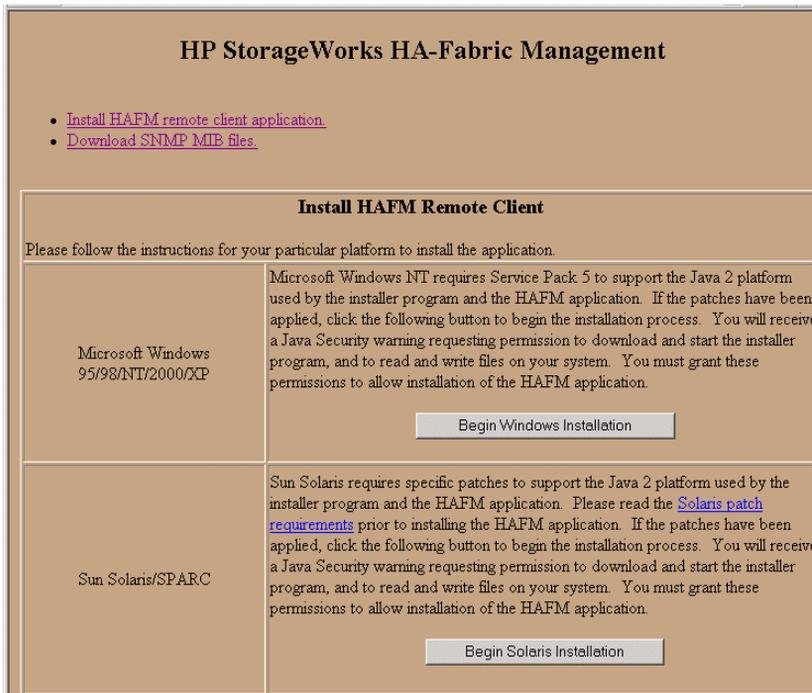
For example;

`http://HAFMserver`

where “HAFMserver” is the network address of the HAFM server.

Obtain the HAFM server address from your network administrator

The **HP StorageWorks HAFM** page displays. [Figure C-1](#) illustrates a partial page with the Windows installation section.



**Figure C-1: HP HAFM page**

- On the page, click **Begin Solaris Installation** to begin the installation process. A security warning page prompts you to install the InstallAnywhere Web Installer (Figure C-2).



**Figure C-2: Security Warning page**

- If you have read the security agreement information and wish to continue, click **Yes**. The **HP High Availability Fabric Manager (HAFM) InstallAnywhere Web Installer** page displays.
- On the **HP HAFM InstallAnywhere Web Installer** page, click **Start Installer for Solaris SPARC**. The system begins downloading the High Availability Fabric Manager installer.

When the download is complete, the **Introduction** screen displays (similar to Figure B-4 on page B-5).

- Click **Next**.

At any time, you may return to the previous page by clicking **Previous** or quit the Installer by clicking **Exit**.

The **License Agreement** screen displays (similar to Figure B-5 on page B-6).

- If you have read the license agreement and agree to accept the terms, click **I accept the terms of the License Agreement**. Click **Next**.

The **Important Information** screen displays (similar to Figure B-6 on page B-6).

8. Click **Next**.

The **Choose Install Folder** screen displays (similar to [Figure B-7 on page B-7](#)).

9. Choose a folder on the remote workstation in which to store the HAFM software. You can accept the default location, type in the path to a new location, or click **Choose** to browse for an appropriate location. Click **Restore Default Location** to change the location back to the default.
10. Click **Next**.

**NOTE:** If the High Availability Fabric Manager is already installed on the system, you will be prompted to uninstall the existing version of the High Availability Fabric Manager. If you want to uninstall the existing software, click **Yes** and press **Next**. In the **Uninstall High Availability Fabric Manager** window, click **Uninstall**. When the uninstallation process is done, click **Quit**.

The **Choose Shortcut Location** screen displays.

11. Select a shortcut location. The options for the location of High Availability Fabric Manager links are:
  - **In your home folder**—Adds a new program group on the **Start** menu for the High Availability Fabric Manager.
  - **Other**—Enables you to choose any location on your hard drive or network for the High Availability Fabric Manager files.
  - **Don't create links**—Prevents the installation from creating a link for the High Availability Fabric Manager.

12. Click **Next** to begin the installation.

The **Pre-Installation Summary** screen displays (similar to High Availability Fabric Manager).

13. Review the installation information and click **Install**.

The progress of the installation is tracked on the **Installing HP StorageWorks HAFM** screen (similar to [Figure B-10 on page B-10](#)).

14. When complete, the screen shown in [Figure B-11 on page B-10](#) displays. If desired, enable the **Start the High Availability Fabric Manager** check box to immediately open the High Availability Fabric Manager. Click **Done** to close the **Install Complete** dialog box.

## Running the High Availability Fabric Manager

Run the High Availability Fabric Manager program from the directory in which you saved it (the default is a subdirectory named HAFM in your home directory).

1. In the Terminal window, type `cd HAFM`.
2. Press **Enter**.
3. Then type `HAFM_Manager`.
4. Press **Enter**.

The *High Availability Fabric Manager* application opens.



---

## Configuring Remote Workstations: HP-UX, AIX, and Linux

This appendix describes the procedures for installing the high availability fabric manager on a remote HP-UX, AIX, or Linux workstation. To run the High Availability Fabric Manager on a remote workstation, you must first download and install the *High Availability Fabric Manager* application from the HAFM server.

**NOTE:** The figures in this chapter show Netscape Navigator as the internet browser; however, it is acceptable to use Microsoft Internet Explorer during these procedures.

### Requirements

The download and installation process requires the use of a PC with the following minimum system requirements:

- Operating system (one of the following):
  - HP-UX 11.
  - AIX minimum version 4.3.3.
  - Linux minimum version 2.2.5.
- 400 MHz HA PA-RISC processor.
- 128 MB RAM.
- Available disk space:
  - 90 MB for HP-UX
  - 40 MB for AIX minimum version 4.3.3.
  - 55 MB for Linux minimum version 2.2.5.
- Video card supporting 256 colors at 800 x 600 resolution.

- Ethernet network adapter.
- Java-enabled Internet browser, such as Microsoft Internet Explorer (version 3.0 or later) or Netscape Navigator (version 3.0 or later).

Newer versions of the High Availability Fabric Manager or Product Managers installed on the HAFM server will automatically download when the remote clients log in to the HAFM server.

## Procedure

1. Open a *Terminal* window by choosing **Terminal** from the **Personal Applications** subpanel.

2. At the prompt (#), type `netscape`. Press **Enter**.

The Netscape browser opens.

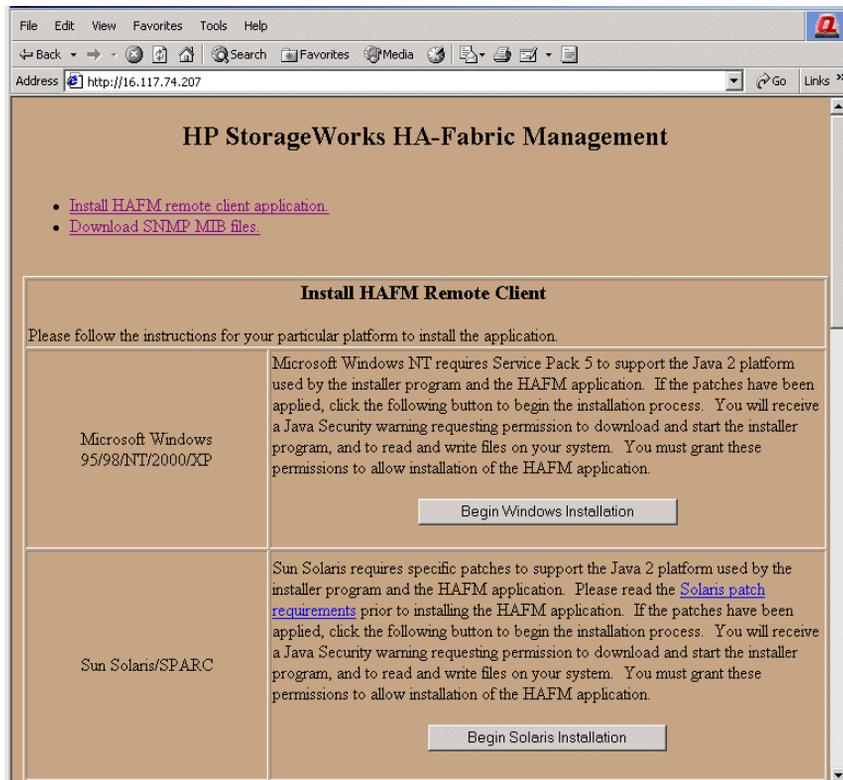
3. Type the address of the HAFM server in the **Location** (or **Address**) box of the browser, then press **Enter**.

```
http://HAFMserver
```

where “HAFMserver” is the IP address and DNS host name of the HAFM server.

Obtain the HAFM server address from your network administrator.

The **HP StorageWorks HAFM** page displays. [Figure D-1 on page D-3](#) illustrates the top portion of this page.

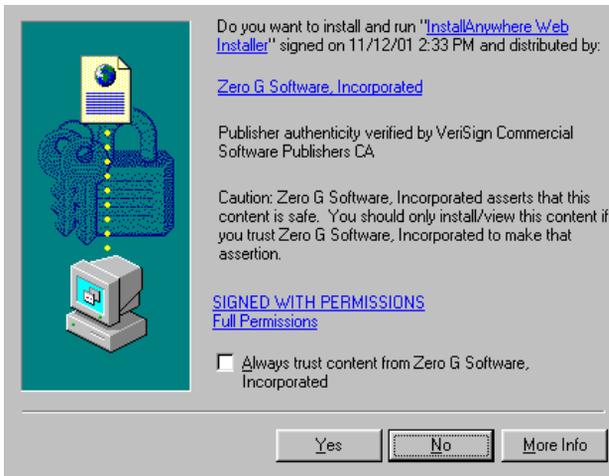


**Figure D–1: HP StorageWorks HAFM page**

4. Read the instructions for your operating system.

If a reference to fixes is made, click the hyperlink and verify that your system is up-to-date.

5. Click the appropriate button (**Begin HP-UX Installation/Begin AIX Installation/Begin Linux Installation**) to begin the installation process. A security warning page prompts you to install the InstallAnywhere Web Installer ([Figure D–2 on page D-4](#)).



**Figure D–2: Security Warning page**

1. If you have read the security agreement information and wish to continue, click **Yes**. The **HP High Availability Fabric Manager InstallAnywhere Web Installer** page displays for HP-UX, AIX, and Linux.
2. On the **HP High Availability Fabric Manager InstallAnywhere Web Installer** page, click **Start Installer for <platform>**, where <platform> is the type of operating system used by the system, for example, HP-UX. The system begins downloading the High Availability Fabric Manager installer.
3. A **Save As** dialog box displays automatically with the default filename *hpClientInstall.bin*. Change the filename to: */home/hpClientInstall.bin*. Click **OK**.  
Software download begins.
4. Close the **Netscape** window.
5. In the Terminal window, type `cd /home`. Press **Enter**. Then type `sh hpClientInstall.bin`. Press **Enter**.

When the download is complete, the **Introduction** screen displays (similar to [Figure B–4 on page B-5](#)).

Be aware that there may be a considerable delay.

6. Click **Next**.

At any time, you may return to the previous page by clicking **Previous** or quit the Installer by clicking **Exit**.

The **License Agreement** screen displays (similar to [Figure B-5 on page B-6](#)).

7. If you have read the license agreement and agree to accept the terms, click **I accept the terms of the License Agreement**. Click **Next**.

The **Important Information** screen displays (similar to [Figure B-6 on page B-6](#)).

8. Click **Next**.

The **Choose Install Folder** screen displays (similar to [Figure B-7 on page B-7](#)).

9. Choose a folder on the remote workstation in which to store the High Availability Fabric Manager software. You can accept the default location, type in the path to a new location, or click **Choose** to browse for an appropriate location. Click **Restore Default Location** to change the location back to the default.

10. Click **Next**.

**NOTE:** If the High Availability Fabric Manager is already installed on the system, you will be prompted to uninstall the existing version of the High Availability Fabric Manager. If you want to uninstall the existing software, click **Yes** and press **Next**. In the **Uninstall High Availability Fabric Manager** window, click **Uninstall**. When the uninstallation process is done, click **Quit**.

The **Choose Shortcut Location** screen displays.

11. Select a shortcut location from this screen. The options for the location of High Availability Fabric Manager links are:

- **In your home folder**—Adds a new program group on the **Start** menu for the High Availability Fabric Manager.
- **Other**—Enables you to choose any location on your hard drive or network for the High Availability Fabric Manager files.
- **Don't create links**—Prevents the installation from creating a link for the High Availability Fabric Manager.

12. Click **Next** to begin the installation.

The **Pre-Installation Summary** screen displays (similar to [Figure B-9 on page B-9](#)).

13. Review the installation information and click **Install**.

The progress of the installation is tracked on the **Installing High Availability Fabric Manager** screen (similar to [Figure B-10 on page B-10](#)).

14. When complete, the screen shown in [Figure B-11 on page B-10](#) displays. If desired, enable the **Start the High Availability Fabric Manager** check box to immediately open the High Availability Fabric Manager. Click **Done** to close the **Install Complete** dialog box.

## Running the High Availability Fabric Manager

Run the High Availability Fabric Manager program from the directory in which you saved it.

1. In the Terminal window, type:

```
cd HAFM
```

2. Press **Enter**.

3. Type:

```
./HAFM
```

4. Press **Enter**.

The *High Availability Fabric Manager* application will open.

---

# Glossary

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

**access control**

List of all devices that can access other devices across the network and the permissions associated with that access. *See also* persistent binding and zoning.

**active zone set**

Single zone set that is active in a multiswitch fabric. It is created when you enable a specified zone set. This zone set is compiled by checking for undefined zones or aliases.

**agent**

Software that processes queries on behalf of an application and returns replies.

**alarm**

SNMP message notifying an operator of a network or device problem.

**alias server**

Fabric software facility that supports multicast group management.

**audit log**

Log summarizing actions (audit trail) made by the user.

**authentication**

Verification of identity for a person or process.

**beaconing**

Use of light-emitting diodes on ports, port cards, field-replaceable units, and Directors to aid in the fault-isolation process; when enabled, active beaconing will cause LEDs to illuminate for faulty components.

**BB\_Credit**

Also known as buffer-to-buffer credit. Indicates the maximum number of frames a port can transmit without receiving a receive ready signal from the receiving device.

**BER**

*See* bit error rate.

**bidirectional**

In Fibre Channel, the capability to simultaneously communicate at maximum speeds (100 Mbps) in both directions over a link.

**bit error rate**

Also known as BER. Ratio of received bits that contain errors to total of all bits transmitted.

**blocked port**

Devices communicating with the port are prevented from logging into the Director or communicating with other devices attached to the Director. A blocked port continuously transmits the offline sequence.

**bridge**

Device that connects and passes packets between two network segments that use the same communications protocol.

**broadcast**

Send a transmission to all N\_Ports on a fabric.

**broadcast frames**

Data packet, also known as a broadcast packet, whose destination address specifies all computers on a network. *See also* multicast.

**buffer**

Storage area for data in transit. Buffers compensate for differences in processing speeds between devices. *See also* BB\_Credit.

**call-home**

Product feature which enables the HAFM server to automatically dial out to a support center and report system problems. The support center server accepts calls from the HAFM server, logs reported events, and can notify one or more support center representatives.

**central memory module card**

Also known as CMM. Circuit card that provides the storage area for Fibre Channel ports to deposit and retrieve Fibre Channel frames. Each port is allocated a portion of this memory divided into a fixed number of frame buffers.

**channel**

Point-to-point link that transports data from one point to the other.

**class of Fibre Channel service**

Defines the level of connection dedication, acknowledgment, and other characteristics of a connection.

**Class F Fibre Channel service**

Used by Switches to communicate across interswitch links (ISLs) to configure, control, and coordinate a multswitch fabric.

**Class 2 Fibre Channel service**

Provides a connectionless (not dedicated) service with notification of delivery or nondelivery between two N\_Ports. In-order delivery of frames is not guaranteed.

**Class 3 Fibre Channel service**

Provides a connectionless (not dedicated) service without notification of delivery or nondelivery between two N\_Ports. Also known as a datagram.

**CMM**

*See* central memory module card.

**community profile**

Information that specifies which management objects are available to what management domain or SNMP community name.

**concurrent maintenance**

Ability to perform maintenance tasks, such as removal or replacement of field-replaceable units, while a hardware product is operating. *See also* [nondisruptive maintenance](#).

**configuration data**

Configuration data includes: identification data, port configuration data, operating parameters, SNMP configuration, and zoning configuration. A configuration backup file is required to restore configuration data if the nonredundant CTP card in a Director is removed and replaced.

**connectionless**

Nondedicated link. Typically used to describe a link between nodes which allows the Switch to forward Class 2 or Class 3 frames as ports allow. Contrast this to the dedicated bandwidth that is required in a Class 1 Fibre Channel Service point-to-point link.

**connector**

*See* optical fiber connector.

**control processor card**

Also known as CTP. Circuit card that contains the Director microprocessor. The CTP card also initializes hardware components of the system after power-on. A 10 Mbps RJ-45 twisted pair connector is located on the CTP card to connect to the Ethernet LAN and communicate with the HAFM server or a specific management station.

**CRC**

*See* cyclic redundancy check.

**CTP**

*See* control processor card.

**cyclic redundancy check**

Also known as CRC. System of error checking performed at both the sending and receiving station using the value of a particular character generated by a cyclic algorithm. When the values generated at each station are identical, data integrity is confirmed.

**DASD**

Direct access storage device such as a disk drive.

**datagram**

See Class 3 Fibre Channel service.

**default**

Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

**default zone**

Contains all attached devices that are not members of a separate zone.

**destination address**

Address identifier that indicates the targeted destination of a data frame.

**device**

Product, connected to a managed Director, that is not controlled directly by the Product Manager. *See also* node.

**diagnostics**

Procedures used by computer users and service personnel to diagnose hardware or software error conditions.

**dialog box**

A dialog box is a window containing informational messages or data fields to be modified or filled in with desired options.

**D\_ID**

See destination address.

**Director**

An intelligent Fibre Channel switching device providing any-to-any port connectivity between nodes (end devices) on a switched fabric. The Director sends data transmissions (data frames) between nodes in accordance with the address information present in the frame headers of those transmissions.

**DNS name**

Domain name system or (domain name service). Host or node name for a device or managed product that is translated to an IP address through a domain name server.

**domain ID**

Number (1 through 31) that uniquely identifies a Switch in a multiswitch fabric. A distinct domain ID is automatically allocated to each Switch in the fabric by the principal Switch.

**E\_Port**

See expansion port.

**E\_D\_TOV**

See error detect time-out value.

**error-detect time-out value**

E\_D\_TOV defines the time the Switch waits for an expected response before declaring an error condition.

**error message**

Indication that an error has been detected. *See also* error message and information message.

**Ethernet**

A widely-implemented local area network (LAN) protocol that uses a bus or star topology and served as the basis for the IEEE 802.3 standard, which specifies the physical and software layers. Baseband LAN allows multiple station access to the transmission medium at will, without prior coordination, and avoids or resolves contention.

**event code**

Code that provides the operator with information concerning events.

**event log**

Record of significant events that have occurred on the Director, such as FRU failures, degraded operation, and port problems.

**expansion port**

Physical interface on a Fibre Channel Switch within a fabric, that attaches to an expansion (E\_Port) on another Fibre Channel Switch to form a multiswitch fabric. *See also* segmented E\_Port.

**explicit fabric login**

Data field size, supported by an F-Port, that is agreed upon during fabric login.

**fabric**

Entity that interconnects N\_Ports and is capable of routing (switching) Fibre Channel frames using the destination ID information in the Fibre Channel frame header accompanying the frames.

**fabric element**

Any active Director or node in a switched fabric.

**fabric port**

Physical interface within the fabric that connects to an N\_Port through a point-to-point full duplex connection.

**failover**

Automatic and nondisruptive transition of functions from an active FRU that has failed to a backup FRU.

**FCC-IOC**

See Fibre Channel I/O controller.

**FCP**

A standard Fibre Channel protocol used to run SCSI over Fibre Channel.

**FE-MIB**

See Fibre Channel fabric element.

**fiber optics**

Branch of optical technology concerned with the transmission of light pulses through fibers made of transparent materials such as glass, fused silica, and plastic.

**fiber**

Physical media types supported by the Fibre Channel specification, such as optical fiber, twisted pair, and coaxial cable.

**Fibre Channel**

Integrated set of standards recognized by ANSI which defines specific protocols for flexible information transfer. Logically, a point-to-point serial data channel, structured for high performance.

**Fibre Channel fabric element**

Any device linked to a fabric. Information about these devices is recorded in a management information base (MIB) which can be accessed by fabric management software.

**Fibre Channel I/O controller**

Controls the embedded Fibre Channel port on the message path controller card (MPC) and configures the ports' ASICs.

**field-replaceable unit**

Assembly removed and replaced in its entirety when any one of its components fails.

**firmware**

Embedded program code that resides and executes on the Director.

**F\_Port**

See fabric port.

**FRU**

See [field-replaceable unit](#).

**gateway address**

In TCP/IP, a device that connects two systems that use the same or different protocols.

**generic port**

Also known as G\_Port. Physical interface on a Director that can function either as a fabric port (F\_Port) or an extension port (E\_Port) depending on the port type to which it connects.

**G\_Port**

See generic port.

**G\_Port module (GPM) card**

Also known as GPM card. Port card that implements four G\_Ports and provides the physical connection point for links to Fibre Channel devices.

**HAFM Management Services**

Software application that provides back-end product-independent services to the *High Availability Fabric Manager* application. HAFM Management Services runs only on the HAFM server (and cannot be downloaded to remote workstations).

**HAFM server**

PC shipped with a product to run the *High Availability Fabric Manager*, *Product Manager*, and *SDC Fabric Manager* applications.

**hardware log**

Record of FRU insertions and removals in the Director.

**HBA**

See [host bus adapter](#).

**high availability**

A performance feature characterized by hardware component redundancy and support for hot-swapping (enabling non-disruptive maintenance). These systems maximize system uptime while providing superior reliability, availability, and serviceability.

**hop**

Data transfer from one node to another node.

**host bus adapter**

Logic card that provides a link between the server and storage subsystem, and that integrates the operating systems and I/O protocols to ensure interoperability.

**hot-swapping**

Removing and replacing a device's components while the device continues to operate normally.

**HP StorageWorks High Availability Fabric Manager**

Software application that is the system management framework providing the user interface for managing HP Fibre Channel connectivity products. The High Availability Fabric Manager can run both locally on the HAFM server and remotely on a user workstation.

**hub**

In Fibre Channel, a device that connects nodes into a logical loop by using a physical star topology.

**IML**

See [initial machine load](#).

**information message**

Message telling a user that a function is performing normally or has completed normally. See also [error message](#) and [warning message](#).

**initial machine load**

Also known as IML. Hardware reset for all installed CTP cards on the Director. It does not affect other hardware. It is initiated by pushing the IML button on a Director's operating panel.

**initial program load**

Process of initializing the device and causing the operating system to start. Initiated through a menu in the Product Manager, this option performs a hardware reset on the active CTP only.

**interface**

Hardware, software, or both, linking systems, programs, or devices.

**internet protocol address**

Unique string of numbers (in the format xxx.xxx.xxx.xxx) that identifies a device on a network.

**interoperability**

Ability to communicate, execute programs, or transfer data between various functional units over a network.

**interswitch link**

Also known as ISL. Physical E\_Port connection between two Directors in a fabric.

**IP address**

See internet protocol address.

**IPL**

See [initial program load](#).

**ISL**

See [interswitch link](#).

**jumper cable**

Optical cable that provides physical attachment between two devices or between a device and a distribution panel. Contrast with trunk cable.

**latency**

When used in reference to a Fibre Channel switching device, latency refers to the amount of time elapsed between receipt of a data transmission at a Switch's incoming F\_Port (from the originating node port) to retransmission of that data at the Switch's outgoing F\_Port (to the destination N\_Port). The amount of time it takes for data transmission to pass through a switching device.

**LIN**

See [link incident](#).

**link**

Physical connection between two devices on a switched fabric.

**link incident**

Interruption to link due to loss of light or other causes.

**load balancing**

Ability to evenly distribute traffic over multiple interswitch links within a fabric. Load balancing on HP Directors takes place automatically.

**logical unit number**

Also known as LUN. In Fibre Channel addressing, a logical unit number is a number assigned to a storage device which, in combination with the storage device's node port's World Wide Name, represents a unique identifier for a logical device on a storage area network.

**loopback plug**

In a fiber optic environment, a type of duplex connector used to wrap the optical output signal of a device directly to the optical input.

**loopback test**

Test that checks attachment or control unit circuitry, without checking the mechanism itself, by returning the output of the mechanism as input.

**LUN**

See [logical unit number](#).

**MAC address**

See Media Access Control address.

**maintenance port**

Connector on the Director operator panel where a PC running an ASCII terminal emulator can be attached or dial-up connection made for specialized maintenance support.

**managed product**

Hardware product that can be managed with the Product Manager. For example, the HP StorageWorks Director 2/64 is a managed product. *See also* device.

**management information base**

Related set of software objects (variables) containing information about a managed device and accessed via SNMP from a network management station.

**management session**

Management session exists when a user logs on to the High Availability Fabric Manager. HAFM can support multiple concurrent management sessions. The user must specify the network address of the High Availability Fabric Manager's server at logon time.

**Media Access Control address**

Hardware address of a node (device) connected to a network.

**message path controller card**

Message path controller card (MPC) provides the mechanism for messages to be sent and received between ports on the Director. The card also provides a system clock source, and central control and distribution of clocks for MPC, GPM, and CMM cards.

**MIB**

*See* management information base.

**MPC**

*See* message path controller card.

**multicast**

Delivery of a single transmission to multiple destination N\_Ports. Can be one to many or many to many. All members of the group are identified by one IP address.

**multiswitch fabric**

Fibre Channel fabric created by linking more than one Director or fabric switching device within a fabric.

**name server**

Program that translates names from one form into another. Domain name servers (DNS) translate domain names into IP addresses.

**name server zoning**

N\_Port access management that allows N\_Ports to communicate if and only if they belong to a common name server zone.

**network address**

Name or address that identifies a managed product, such as the HP StorageWorks Director 2/64 on a TCP/IP network. The network address can be either an IP address in dotted-decimal notation (comprised of four three-digit octets in the format xxx.xxx.xxx.xxx), or a domain name (as administered on a customer network).

**nickname**

Alternate name assigned to a World Wide Name for a node or Director in the fabric.

**node**

In Fibre Channel terminology, node refers to an end device (Server or storage device) that is or can be connected to a switched fabric.

**node port**

Physical interface within an end device which can connect to an F\_Port on a switched fabric or directly to another N\_Port (in point-to-point communications).

**nondisruptive maintenance**

Ability to service FRUs (including maintenance, installation, removal and replacement) while normal operations continue without interruption. *See also* concurrent maintenance.

**N\_Port**

*See* node port.

**offline sequence (OLS)**

Sequence sent by the transmitting port to indicate that it is attempting to initialize a link and has detected a problem in doing so.

**optical cable**

Fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications. *See also* jumper cable, optical cable assembly, and trunk cable.

**optical cable assembly**

Optical cable that is connector-terminated. *See* jumper cable and optical cable.

**optical fiber connector**

Hardware component that transfers optical power between two optical fibers or bundles and is designed to be repeatedly connected and disconnected.

**out-of-band management**

Transmission of management information using frequencies or channels other than those routinely used for information transfer.

**packet**

Logical unit of information (usually in the form of a data frame) transmitted on a network. It contains a header (with all relevant addressing and timing information), the actual data, and a trailer (which contains the error checking function, usually in the form of a cyclic redundancy check), and frequently user data.

**password**

Unique string of characters known to the computer system and to a user who must specify it to gain full or limited access to a system and to the information stored within it.

**path**

In a network, any route between any two ports.

**persistent binding**

A form of server-level access control that uses configuration information to bind a server to a specific Fibre Channel storage volume (or logical device) using a unit number.

**port**

Receptacle on a device to which a cable leading to another device can be attached.

**port card**

Field-replaceable hardware component that provides the port connections for fiber cables and performs specific device-dependent logic functions.

**port name**

Name that the user assigns to a particular port through the Product Manager.

**POST**

*See* power-on self-test.

**power-on self-test**

Series of self-tests executed each time the unit is started or reset.

**preferred domain ID**

Domain ID assigned to a Switch is assigned by the principal Switch in a switched fabric. The preferred domain ID becomes the active domain ID except when configured otherwise by the user.

**principal Switch**

In a multiswitch fabric, the Switch that allocates domain IDs to itself and to all other Switches in the fabric. There is always one principal Switch in a fabric. If a Switch is not connected to any other Switches, it acts as its own principal Switch.

**Product Manager**

Application that implements the management user interface for the Director.

**product name**

User-configurable identifier assigned to a managed product. Typically, this name is stored on the product itself. For the HP StorageWorks Director 2/64, the product name can also be accessed by an SNMP manager as the system name.

**R\_A\_TOV**

*See* resource allocation time-out value.

**redundancy**

Performance characteristic of a system or product whose integral components are backed up by identical components to which operations will automatically failover in the event of a component failure. Redundancy is a vital characteristic of virtually all high-availability (24 hr/7 days per week) computer systems and networks.

**remote access link**

Connection to a device or program on a computer network via a (geographically) remote workstation.

**remote notification**

A process by which a system is able to inform remote users and/or workstations of certain classes of events that occur on the system. E-mail notification and the configuration of SNMP trap recipients are two examples of remote notification programs that can be implemented on director-class switches.

**remote user workstation**

Workstation, such as a PC, using High Availability Fabric Manager and Product Manager software that can access the HAFM server over a LAN connection.

**resource allocation time out value**

R\_A\_TOV is a value used to time out operations that depend on the maximum possible time that a frame could be delayed in a fabric and still be delivered.

**SAN**

*See* storage area network.

**SC**

Subscriber connectors.

**segmented E\_Port**

E\_Port that has ceased to function as an E\_Port within a multiswitch fabric due to an incompatibility between the fabrics that it joins. *See also* expansion port.

**SEL**

System error light.

**SNMP**

Simple network management protocol.

**SNMP community**

Also known as SNMP community string. An SNMP community is a cluster of managed products (in SNMP terminology, hosts) to which the server or managed product running the SNMP agent belongs.

**SNMP community name**

The name assigned to a given SNMP community. Queries from an SNMP management station to a device running an SNMP agent will only elicit a response if those queries are addressed with the correct SNMP community name.

**SSP**

*See* system services processor.

**storage area network**

A high-performance data communications environment that interconnects computing and storage resources so that the resources can be effectively shared and consolidated.

**subnet mask**

Used by a computer to determine whether another computer with which it needs to communicate is located on a local or remote network. The network mask depends upon the class of networks to which the computer is connecting. The mask indicates which digits to look at in a longer network address and allows the router to avoid handling the entire address. Subnet masking allows routers to move the packets more quickly. Typically, a subnet may represent all the machines at one geographic location, in one building, or on the same local area network.

**switch priority**

Value configured into each Switch in a fabric that determines its relative likelihood of becoming the fabric's principal Switch.

**system automation for OS/390 (SA OS/390)**

IBM-licensed software that provides System/390 Parallel Sysplex management, automation capabilities, and integrated systems and network management. SA OS/390 manages host, remote processor, and I/O operations. SA OS/390 integrates the functions of Automated Operations Control for MVS, ESCON Manager, and Target System Control Facility.

**system services processor**

Controls the RS-232 maintenance port, the Ethernet port, and the operator panel of a Fibre Channel Director.

**Tivoli**

A suite of Enterprise management software products produced by a division of IBM.

**topology**

Logical and/or physical arrangement of stations on a network.

**trap**

Unsolicited notification of an event originating from a SNMP managed device and directed to an SNMP network management station.

**trap host**

SNMP management workstation that is configured to receive traps.

**trunk cable**

Cable consisting of multiple fiber pairs that do not directly attach to an active device. This cable usually exists between distribution panels and can be located within, or external to, a building. *Contrast with* jumper cable.

**unblocked port**

Devices communicating with an unblocked port can log in to the Director and communicate with devices attached to any other unblocked port, assuming that this is supported by the current zoning configuration.

**unicast**

Communication between a single sender and a single receiver over a network. Compare to *multicast* (communication between a single sender and multiple receivers) and *anycast* (communication between any sender and the nearest of a group of receivers). Similar in meaning to *point-to-point communication*.

**vital product data**

System-level data stored by the backplane in the electrically erasable programmable read-only memory. This data includes serial numbers and identifies the manufacturer.

**VPD**

*See* vital product data.

**warning message**

Indication that a possible error has been detected. *See also* error message and information message.

**wrap plug**

*See* loopback plug.

**World Wide Names WWN)**

Eight-byte address that uniquely identifies a Switch, or a node (end device), even on global networks.

**zone**

Set of devices that can access one another. All connected devices may be configured into one or more zones. Devices in the same zone can see each other. Those devices that occupy different zones cannot.

**zone member**

Specification of a device to be included in a zone. A zone member can be identified by the port number of the Director to which it is attached or by its device (or HBA) World Wide Name. In multiswitch fabrics, identification of end-devices/nodes by World Wide Name is preferable.

**zone set**

*See* zone.

**zoning**

Grouping of several devices by function or by location. All devices connected to a connectivity product, such as the Director, may be configured into one or more zones. *See also* zone.



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