Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class User Guide

Abstract

This document provides information about setting up, configuring, and maintaining the Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class. It is intended for system administrators and technicians with knowledge of SANs and Cisco switches.

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Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class User Guide

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1 Overview

The Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class (referred to hereafter as the Cisco MDS 8Gb Fabric Switch) is a FC switch that supports link speeds of up to 8 Gb. The Cisco MDS 8Gb Fabric Switch can operate in a fabric containing multiple switches or as the only switch in a fabric.

Switch features

The Cisco MDS 8Gb Fabric Switch provides the following features:

- Fully integrated, embedded FC SAN design that connects directly to the HP BladeSystem c-Class enclosure midplane
- On-Demand Port Activation Licensing enables you to activate an additional 12 ports
- Easy to manage HP Storage Essentials and HP Systems Insight Manager support
- Fully compatible with the HP C-series family of multilayer directors and fabric switches
- Sixteen internal 8/4/2 Gbps auto-sensing FC interconnect technology with the following characteristics:
  - Independent automatic negotiation to the highest common speed for each server FC port connected to the Cisco MDS 8Gb Fabric Switch
  - Universal self-configuring ports, which can become F_Ports (fabric enabled)
- Eight external 8/4/2 Gbps FC SFP ports, with the following characteristics:
  - Automatic negotiation to the highest common speed of all devices and switches connected to the port
  - Port interface-compatible SFP transceivers
  - Universal self-configuring ports, which can become F_Ports (fabric enabled), FL_Ports, E_Ports, TE_Ports, FX_Ports, or SD_Ports
- Heterogeneous support for mixed storage fabrics
- Power supplied and controlled by the BladeSystem enclosure
- Identification to HP chassis management via HP specified SEEPROMs
- Hot-swap capability
- Compatible with redundant and dual redundant Cisco MDS 8Gb Fabric Switch configurations in BladeSystem c-Class
- Hot code activation
- Real-time clock
- SFP port monitoring

Component identification

Figure 1 identifies the physical components of the Cisco MDS 8Gb Fabric Switch.

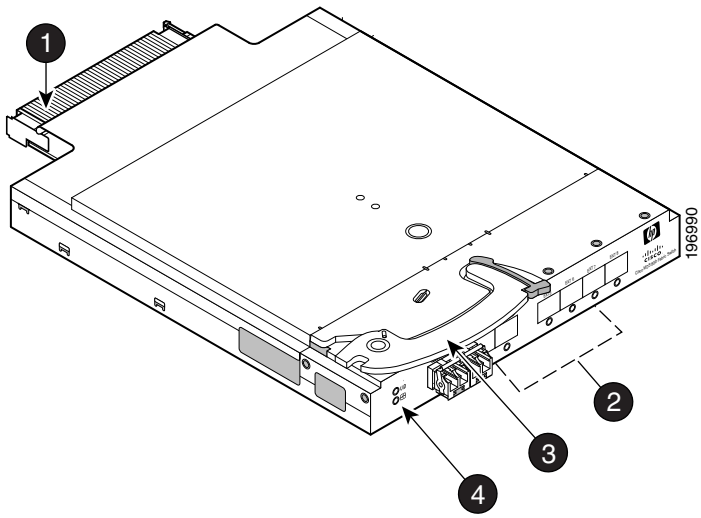


Figure 1 Identifying components

1 Midplane connector
2 External SFP ports (Two populated, six unpopulated
3 Installation handle
4 UID and Health LEDs)

Port side of the switch

Figure 1 identifies Cisco MDS 8Gb Fabric Switch external ports (ports EXT 1 through EXT 4 and ports EXT 5 through EXT 8).

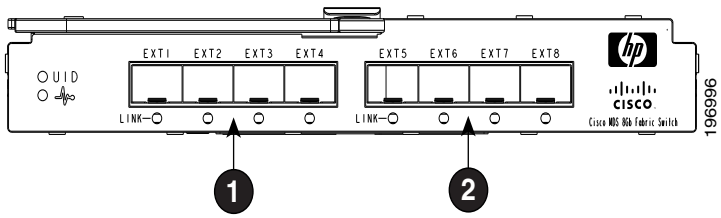


Figure 2 Cisco MDS 8Gb Fabric Switch external ports

1 Left bank—EXT 1, EXT 2, EXT 3 and EXT 4
2 Right bank—EXT 5, EXT 6, EXT 7 and EXT 8

NOTE:
See **Interpreting LED activity** for complete information on Cisco MDS 8Gb Fabric Switch LEDs.

Internal ports summary

Sixteen logical internal ports (numbered 1 through 16) connect sequentially to server bays 1 through 16 with the enclosure midplane. Server bay 1 is connected to Switch Port 1, Server bay 2 is connected to Switch port 2, and so forth.

Switch redundancy

The HP BladeSystem c-Class is engineered as a no-single-point-of-failure bladed solution. Attributes that contribute to switch redundancy include:

- Redundant power and cooling
- Redundant HP Onboard Administrator (OA) to ensure management access to the switch

NOTE:
The HP Onboard Administrator is the enclosure management module used to support and manage the HP BladeSystem c-Class and all managed devices used in the enclosure.

Switch licensing

The Cisco MDS 8Gb Fabric Switch integrates one of two license options that complement existing HP product lines:

- Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class, base, integrating 12 active ports (8 internal and 4 external) and two preinstalled short range SFPs.
- Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class, base, integrating 24 active ports (16 internal and 8 external) and four preinstalled short range SFPs.

For both models, the software components include Cisco Fabric Manager and Cisco Device Manager.

IMPORTANT:
The Cisco MDS 8Gb Fabric Switch offers optional licenses that include Cisco Fabric Manager Server Package and Enterprise Package. For more information, see the *Cisco MDS 9000 Family NX-OS Licensing Guide* on the Cisco website:
http://www.cisco.com/en/US/products/ps6029/products_installation_and_configuration_guides_list.html

PortChannel

PortChannel is included by default in the Cisco MDS 8Gb Fabric Switch.

NOTE:
For more information about PortChannel, refer to the *Cisco MDS 9000 Family NX-OS Interfaces Configuration Guide* on the Cisco website:
http://www.cisco.com/en/US/products/ps5989/products_installation_and_configuration_guides_list.html

Optional hardware kits

Table 1 shows optional hardware that supports the Cisco MDS 8Gb Fabric Switch.

To find information on the additional options on the HP website:

1. Enter `http://www.hp.com` in your browser address field, and then press **Enter**.
2. Click **Support & Drivers**.
3. Click **See support and troubleshooting information**.
4. Click **Options & Accessories**.
5. Click **Options and Accessories for Networking**.
6. Enter **Cisco MDS 8Gb Fabric Switch** in the **Enter Product Name/Number** field, and then press the button to the left of the field.

   The **Product search results** page appears listing a link to the product you searched for.

7. Click the link.

Table 1 Optional hardware

Option	Part number
Short range 4Gb FC SFP, 4 pack 500m	AE379A
Short range 8Gb FC SFP+, 500m	AJ906A
Long range 8Gb FC SFP+, 10km	AJ907A
.5 m LC-LC Multi-Mode Fibre Channel Cable	AJ833A
1 m LC-LC Multi-Mode Fibre Channel Cable	AJ834A
2 m LC-LC Multi-Mode Fibre Channel Cable	AJ835A
5 m LC-LC Multi-Mode Fibre Channel Cable	AJ836A
15 m LC-LC Multi-Mode Fibre Channel Cable	AJ837A
30 m LC-LC Multi-Mode Fibre Channel Cable	AJ838A
50 m LC-LC Multi-Mode Fibre Channel Cable	AJ839A

2 Installation

Shipping carton contents

The Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class kit shipping carton (Figure 3) contains:

- One Cisco MDS 8Gb Fabric Switch with two or four SFPs installed. Models include:
  - One Cisco MDS 8Gb 12-Port Fabric Switch with eight internal and four external active ports and two 8Gb short range SFPs installed
  - One Cisco MDS 8Gb 24-Port Fabric Switch with sixteen internal and eight external active ports and four 8Gb short range SFPs installed
- One bag containing black, plastic SFP dust covers to insert in ports where SFP optical transceivers are not installed
- *Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class Installation Instructions*

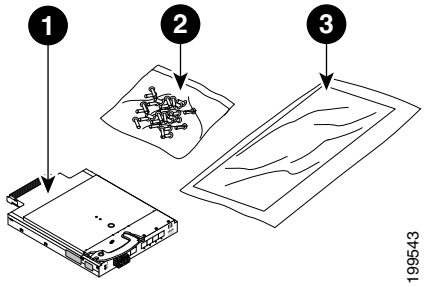


Figure 3 Carton contents

1 Cisco MDS 8Gb Fabric Switch
2 Dust covers for empty SFP ports
3 Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class Installation Instructions

Installation and safety considerations

The Cisco MDS 8Gb Fabric Switch is installed in the I/O bays in the rear of the HP BladeSystem c-Class enclosure. For specific enclosure requirements, see the *HP BladeSystem c7000 Enclosure Setup and Installation Guide* on the HP website:

http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c00698286/c00698286.pdf

Installing multiple switches

When installing multiple switches, install and configure one Cisco MDS 8Gb Fabric Switch at a time. Each switch must be assigned a unique Ethernet IP address during configuration. Once the IP address on the Cisco MDS 8Gb Fabric Switch is set, install additional switches in the enclosure. See the *HP BladeSystem c7000 Enclosure Setup and Installation Guide* for help identifying your specific enclosure setup, available connections, and power requirements.

Electrical considerations

The Cisco MDS 8Gb Fabric Switch requires 55 watts. There are no other power requirements or provisions.

Environmental considerations

Ensure proper cooling and ventilation by verifying the following:

- The air vents on the enclosure are not blocked or restricted.
- The ambient air temperature at the front of the enclosure does not exceed 35°C (95°F) while the switch is operating.

IMPORTANT:
Make sure to insert the dust covers that ship with your Cisco MDS 8Gb Fabric Switch into any ports where SFPs are not installed, to help contain air flow in the BladeSystem chassis.

Installing the switch

CAUTION:
Properly ground yourself before handling the switch.

Do not install multiple switches at the same time with default addresses as this results in an address conflict. See "Setting the IP address" on page 15 for more information.

The Cisco MDS 8Gb Fabric Switch is a hot-pluggable device. The enclosure power can be on or off when inserting the switch.

To install the switch:

1. Locate the appropriate interconnect bay at the rear of the enclosure. For more information, see the *HP BladeSystem c7000 Enclosure Setup and Installation Guide* or *HP BladeSystem c3000 Enclosure Setup and Installation Guide* provided with your enclosure.
2. Remove the slot cover, if installed.

IMPORTANT:
Populate all enclosure I/O bays with the appropriate component; for example a switch, Pass-Thru, or one of the blank panels provided with the enclosure.

3. Press the handle latch to release the installation handle (see Figure 4).

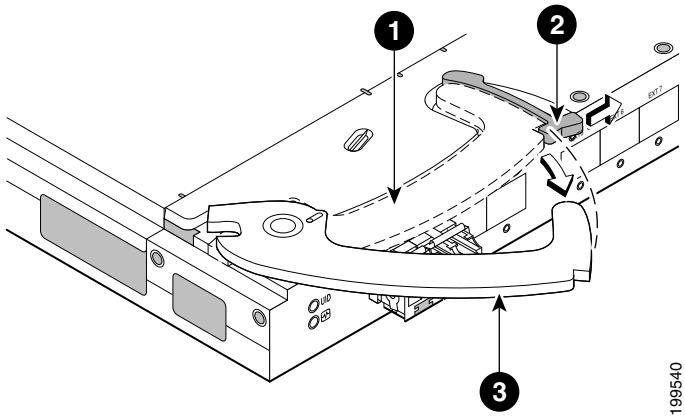


Figure 4 Releasing the installation handle

1 Installation handle in latched position
2 Installation handle latch
3 Installation handle released

4. Align the Cisco MDS 8Gb Fabric Switch with the appropriate interconnect bay according to the specific configuration of the enclosure.

5. Push firmly into the interconnect bay (see Figure 5).

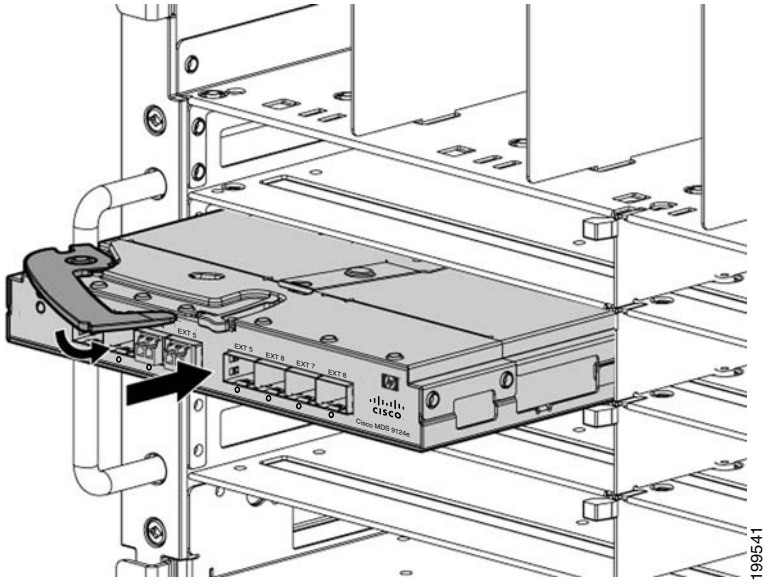


Figure 5 Installing the Cisco MDS 8Gb Fabric Switch into an interconnect bay

6. Press the installation handle into the latch to lock the switch in place.

OA power verification

As defined earlier, the HP BladeSystem Onboard Administrator is the enclosure management tool that manages the devices contained within the enclosure. The OA provides a single point from which to perform basic management tasks on switches or server blades installed in the enclosure.

IMPORTANT:
HP recommends reading the *HP BladeSystem c7000 Enclosure User Guide* and the *HP BladeSystem Onboard Administrator User Guide* in sequence to gain an overall understanding of the enclosure system.

Once the switch is installed in a supported interconnect bay, the OA verifies that the switch type matches the mezzanine cards present on the servers. If there is no mismatch, the OA powers up the switch. If the switch does not power up, check the enclosure and switch status using the OA web interface. For more information, see the *HP BladeSystem Onboard Administrator User Guide*.

3 Login and Configuration

Setting the IP address

Obtain the following items to set the IP address using a serial connection:

- Computer with a terminal application such as HyperTerminal in a Windows environment or TERM in a UNIX environment
- Null modem serial cable

To set the IP address:

1. Verify that the enclosure is powered on.
2. Identify the active OA in the BladeSystem.
3. Connect via Telnet or a null modem serial cable from your computer to the serial port of the active OA.
4. If using an OA serial port, configure the terminal application as follows:
   - In a Windows environment:
     - Baud rate—9600 bits per second
     - 8 data bits
     - None (No parity)
     - 1 stop bit
     - No flow control
   - In a UNIX environment, enter: **`tip /dev/ttyb -9600`**
5. Log into the OA.
6. Identify the interconnect bay number where the switch is installed.
7. Enter the following at the OA command line:

   `connect interconnect x`

   Where **`x`** is the interconnect bay number where the switch is installed.

   If you are using the switch for the first time, the switch setup utility starts automatically. If this is not the first time the switch has been used, enter the setup command at the system prompt.
8. Create a password for the system administrator. (There is no default password.)

NOTE:
Be sure to use a strong password. For detailed information, see the "Configuring User Accounts" section in the *Cisco MDS 9000 NX-OS Security Configuration Guide*.

9. Follow the instructions in the switch setup utility to configure the IP address, netmask, and other parameters for the switch.

NOTE:
For complete information about the switch setup utility, see the *Cisco MDS 9000 NX-OS Fundamentals Configuration Guide*.

10. When you have finished with the switch setup utility, log out and disconnect the serial cable.

Resetting the IP address

To reset the IP address:

1. Log in to the CLI.
2. Enter **`config t`** to enter the configuration mode.
3. Enter **`int mgmt 0`**.
4. Enter **`ip address`** <**`ip`**> <**`mask`**>.

5. Enter **exit**.
6. Enter **ip default-gateway** <**default-gw**>.
7. Enter **exit** to exit the configuration mode.
   The IP address is now reset.
8. Enter **show int mgmt 0** to verify your new settings.

Configuring the switch

The Cisco MDS 8Gb Fabric Switch must be configured to ensure correct operation within a network and fabric. For instructions about configuring the switch to operate in a fabric containing switches from other vendors, see the *HP StorageWorks SAN Design Reference Guide* on the HP website:

http://h18000.www1.hp.com/products/storageworks/san/documentation.html

For more information about the CLI, see the *Cisco MDS 9000 NX-OS Fundamentals Configuration Guide*.

Items required for configuration

The following items are required for configuring and connecting the Cisco MDS 8Gb Fabric Switch for use in a network and fabric:

- Switch installed in the enclosure
- IP address and corresponding subnet mask and gateway address recorded in "Setting the IP address" on page 15
- One Ethernet cable
- SFP transceivers and compatible optical cables, as required
- Access to an FTP server for backing up the switch configuration (optional)

Connecting to the Command Line Interface

To make an Ethernet connection and log into the switch:

1. Connect your workstation to the Ethernet network containing the OA. If the OA is not on a network, connect directly to the OA/iLO Ethernet port on the active OA.

IMPORTANT:
Verify that the switch is not being re-configured from any other connections during the remaining steps.

2. Open a telnet/SSH connection using the IP address set earlier.
   The login prompt displays when the telnet connection locates the switch in the network.
3. Enter the user name, using the administrative account admin.
4. Enter the password.
5. Verify that the login was successful.
   If the login is successful, the prompt displays the switch name.

Setting the date and time

Use the date and time for logging events. Cisco MDS 8Gb Fabric Switch operation does not depend on the date and time. A switch with an incorrect date and time value can function properly.

To set the date and time using the CLI:

1. Connect to the switch and log in as admin.
2. Issue the time and date command using the following syntax:
   `switch# clock set <HH:MM:SS> <DD> <Month in words> <YYYY>`
   where:
   - HH is the hour; valid values are 00 through 23.
   - MM is minutes; valid values are 00 through 59.
   - SS is seconds; valid values are 00 through 59.

- DD is the date; valid values are 01 through 31.
- YYYY is the year; valid values are 2000 through 2030.

For example:

```
switch# clock set 15:58:09 23 September 2002
```

For more information about changing time zones, see the clock command in the *Cisco MDS 9000 Family NX-OS Fundamentals Configuration Guide*.

Verifying installed licenses

To determine the type of licensing included with your Cisco MDS 8Gb Fabric Switch, enter the following at the command line:

```
switch# show license usage
```

For more information about the CLI, see the *Cisco MDS 9000 Family NX-OS Fundamentals Configuration Guide*.

Modifying the FC domain ID (optional)

If the Cisco MDS 8Gb Fabric Switch is not powered on until after it is connected to the fabric and the default FC domain ID is already in use, the domain ID for the new switch is automatically reset to a unique value. If the switch is connected to the fabric after it has been powered on and the default domain ID is already in use, the fabric segments.

Use the **show fcdomain address-allocation** command to display domain ID allocation statistics, including a list of assigned domain IDs.

To modify a preferred domain ID enter the command:

```
switch(config)# fcdomain domain 3 preferred vsan 8
```

This command configures the switch in VSAN 8 to request a preferred domain ID 3 and accepts any value assigned by the principal switch. The domain range is 1 to 239.

To modify a static domain ID enter the command:

```
switch(config)# fcdomain domain 2 static vsan 237
```

This command configures the switch in VSAN 237 to accept only a specific value and moves the local interfaces in VSAN 237 to an isolated state if the requested domain ID is not granted.

On-Demand Ports

Use the **interface** command to enable On-Demand Ports. The following example shows how to use this command:

```
switch# config t
switch(config)# interface ext1
switch(config-if)# shut
switch(config-if)# port-license acquire
```

Disabling and enabling a port

Use the **shutdown** and **no shutdown** commands to disable and enable ports.

To disable a port, enter the following commands:

```
switch# config t
switch(config)# interface ext1
switch(config-if)# shutdown
```

To enable a port, enter the following commands:

```
switch# config t
switch(config)# interface ext1
```

```
switch(config-if)# no shutdown
```

Verifying the configuration

To verify a switch configuration, enter the following commands:

```
switch# show interface ext1
switch# show module
```

Backing up the configuration

To backup a switch configuration, enter the following command:

```
switch# copy running-config startup-config
```

Recovering the admin password

You may need to recover the admin password on the switch if the user does not have another user account on the switch with network-admin privileges.

△ **CAUTION:**
Recovering the admin password requires a power-cycle of the switch. Configuration changes made since the last saved configuration are lost.

To recover the admin password on the switch:

1. Log in to the OA/iLO port through the console or telnet.
2. Connect to the appropriate Cisco MDS 8Gb Fabric Switch bay:
   `OA> connect interconnect x`
   Where **x** is the bay number where the switch is installed.
3. Reset the switch.
4. During the bootup of the switch, issue the following command one or more times at the OA console or telnet session until you see the loader prompt:
   <ctrl> c
5. Verify that you now see the loader prompt, **loader>**.
6. View the kickstart image in bootflash:
   loader> dir bootflash:
   For example: **m9100-s3ek9-kickstart-mz.5.0.1b.bin**
7. Boot the kickstart image:
   loader> boot *kickstart_image*
   For example: **boot m9100-s3ek9-kickstart-mz.5.0.1b.bin**
8. Verify that you see the boot prompt, **switch(boot)#**.
9. Enter the configuration mode:
   switch(boot)# config t
10. Enter a new admin password:
    switch(boot)(config)# admin-password *<new password>*
    switch(boot)(config)# exit
    switch(boot)#
11. View the system image in bootflash:
    switch(boot)# dir bootflash:
    For example: **m9100-s3ek9-mz.5.0.1b.bin**
12. Load the system image:
    switch(boot)# load bootflash:*system_image*
    For example: **load bootflash:m9100-s3ek9-mz.5.0.1b.bin**
13. Verify that you see the switch login prompt, **switch login#**.
14. If necessary, reset the SNMP admin password after logging in to the switch, as in the following example:

```
switch# config t
switch(config)# snmp-server user admin auth md5 <new password>
switch(config)# exit
switch(config)# copy run start
```

For more instructions, see the *Cisco MDS 9000 Family Fabric Manager Fundamentals Configuration Guide* and the *Cisco MDS 9000 Family NX-OS Fundamentals Configuration Guide*.

4 Managing the Switch

Use the management tools built into the Cisco MDS 8Gb Fabric Switch (see Table 2) to monitor the fabric topology, port status, physical status, and other information used for performance analysis and system debugging.

When running IP over FC, these management tools must run on both the Fibre Channel host and the switch and must be supported by the Fibre Channel host driver. For a list of Fibre Channel hosts supported by the Cisco MDS 8Gb Fabric Switch, see the HP StorageWorks Single Point of Connectivity Knowledge (SPOCK) website at http://www.hp.com/storage/spock. You must sign up for an HP Passport to be granted access.

Table 2 Cisco MDS 8Gb Fabric Switch management features

Management tool	Out-of-band support	In-band support
CLI	Ethernet or serial connection	IP over FC
Fabric Manager[1]	Ethernet connection	IP over FC
Standard SNMP applications[1]	Ethernet connection	IP over FC
Management Server[1]	Ethernet connection	SMI-S compliant management program

1. For more information, refer to the *Cisco MDS 9000 Family NX-OS Fundamentals Configuration Guide*.

You can connect a management station to one switch through Ethernet while managing other switches connected to the first switch via FC. To perform this function, set the FC gateway address of each of the other switches to be managed to the FC IP address of the first switch.

The gateway address of the first switch should be set to the gateway address for the subnet on which the first switch resides (see Table 3).

Table 3 Connecting via a management station

	Management station	First switch	Second switch	Third switch
Ethernet	192.168.1.09	192.168.1.10	204.1.1.11	204.1.1.12
FCIP	192.168.65.09	192.168.65.10	192.168.65.11	192.168.65.12
Gateway	192.168.1.10	any, not self	192.168.1.10	192.168.1.10

Maintaining the switch

The Cisco MDS 8Gb Fabric Switch does not require any regular physical maintenance. However, it is critical that environmental conditions, described in "Environmental considerations" on page 11 are met to help prevent switch failure due to heat stress or improper air flow.

Installing dust covers in empty ports

Install the dust covers included in the Cisco MDS 8Gb Fabric Switch shipping carton in ports where SFPs are not installed. Installing dust covers ensures proper airflow and helps reduce dust contamination of the switch.

Replacing an SFP transceiver

To remove an SFP transceiver:

1. Press and hold the cable release.
2. Remove the cable from the transceiver.
3. Pull the bail to release the transceiver.

4. Grasp the bail, and gently but firmly pull the transceiver out of the port.
5. Repeat this procedure for the remaining ports as required.

To install a replacement SFP:

1. Make sure that the bail is in the unlocked position.
2. Orient the SFP with the appropriate port (Figure 6).

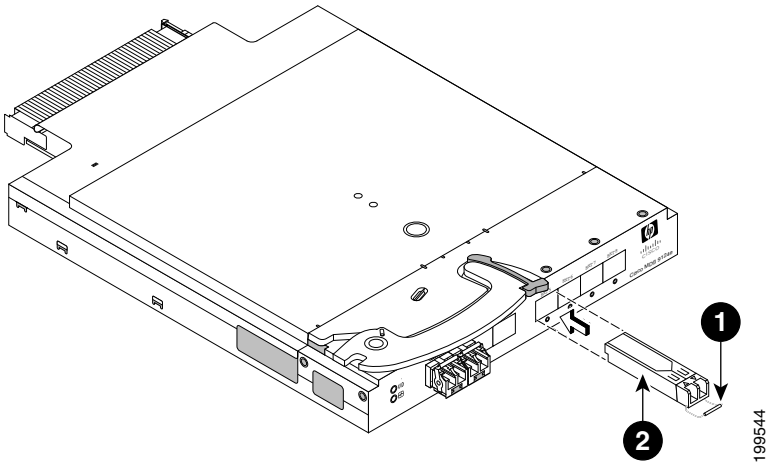


Figure 6 Installing an SFP

1 Bail 2 SFP

3. Insert the SFP into the port until you hear a click.
4. Close the bail.

Replacing the switch

To replace a switch in the HP BladeSystem c-Class enclosure:

1. Create a backup of the existing configuration file. Back up the switch configuration to a remote server.

> **NOTE:** HP recommends that you regularly back up the switch configuration to a remote server and also copy the running configuration to the startup configuration on each switch in the SAN when the configuration changes.

2. Disconnect all external fibre channel cables from the Cisco MDS 8Gb Fabric Switch.
3. Press the handle latch to release the installation handle.
4. Remove the Cisco MDS 8Gb Fabric Switch from the c-Class enclosure.
5. Insert the new Cisco MDS 8Gb Fabric Switch into the c-Class enclosure where the previous Cisco MDS 8Gb Fabric Switch was removed.
6. Log in to the CLI of the c-Class Onboard Administrator.
7. Connect to the console of the switch:
   `OA> connect interconnect x`
   Where **x** is the bay number where the switch is installed.
8. Create an admin password when prompted by the switch.
9. Continue with the setup configuration and enter the appropriate information that matches the Cisco MDS 8Gb Fabric Switch that you removed.
10. Install the same Cisco MDS NX-OS release that was installed on the removed Cisco MDS 8Gb Fabric Switch. For installation instructions, see the *Cisco Fabric Manager Fundamentals Configuration Guide* and the *Cisco MDS 9000 Family Fundamentals Configuration Guide*.
11. If Cisco MDS NX-OS licenses were installed on the removed Cisco MDS 8Gb Fabric Switch, install the appropriate licenses on the replacement switch.

12. If you want all ports to be shut when restoring the switch configuration, edit the last backed up switch configuration file and change all the interface ports to **shutdown**. For example:
```
switch# interface bay1
switch# port-license acquire
switch# no shutdown <- change to shutdown
```
13. Save the switch configuration file after making your edits.
14. Restore the switch configuration from the remote server.
15. Verify that all ports acquire a license:
```
switch# show port-license
```
16. If all ports have not been acquired, acquire them.
17. Reset the SNMP admin password to enable Device Manager and Fabric Manager SNMP login.The following example shows the CLI commands:
```
switch# config t
switch(config)# snmp-server user admin auth md5 new password
switch(config)# copy running-config startup-config
```
For instructions on completing Steps 16 and 17, see the *Cisco Fabric Manager Fundamentals Configuration Guide* and the *Cisco MDS 9000 Family Fundamentals Configuration Guide*.
18. Connect all external fibre channel cables in the same port location as before. All interfaces should remain in the shutdown state until you re-enable them on the switch using the **no shutdown** command.
19. Verify that the switch successfully joins the fabric.

Powering on and off

The Cisco MDS 8Gb Fabric Switch power is provided by the enclosure. Use the OA to power on the switch. When the switch powers on, it runs the power on self-test (POST) process. POST is a system check that is performed each time the switch is powered on, rebooted, or reset. During POST, the LEDs flash different colors. Any errors that occur during POST are listed in the error log. The POST process can take up to three minutes.

Use the OA to power off the switch.

NOTE: Each time the Cisco MDS 8Gb Fabric Switch is powered on, its settings are restored to the startup configuration.

POST steps

The success or failure results of the diagnostic tests that run during POST is monitored through the error log or the CLI.

POST includes the following steps:

- Preliminary POST diagnostics are run
- Operating system is initialized
- Hardware is initialized
- Diagnostic tests are run on several functions, including circuitry, port functionality, memory, statistics counters, and serialization

Interpreting POST results

To determine if POST completed successfully and if any errors were detected:

1. Verify that the switch LEDs indicate all components are healthy. See Table 4 for a description and interpretation of LED patterns.
2. Verify that the switch prompt appears on the terminal of a computer workstation connected to the switch. If there is no switch prompt when POST completes, press `Enter`. If the switch prompt still does not appear, try opening another telnet session or another management tool. If this is not successful, the switch did not successfully complete POST. Contact HP.

3. Review the switch system log for errors. Any errors detected during POST are written to the system log, accessible through the **`show logging logfile`** command. For information about all referenced commands and accessing the error log and error messages, see the *Cisco NX-OS System Messages Reference*.

Boot tasks

Boot completes in approximately three minutes if POST is run. Boot includes the following tasks after POST completes:

- Universal port configuration
- Links initialized
- The fabric is analyzed, and if any ports are connected to other switches, the switch participates in a fabric configuration
- The switch obtains a domain ID and assigns port addresses
- Unicast routing tables constructed
- Normal port operation enabled

Interpreting LED activity

You can monitor switch activity and status by checking the switch LEDs.

There are three possible LED states: no light, a steady light, or a flashing light. The steady lights and flashing lights can be green or amber.

The LEDs flash any of these colors during boot, POST, or other diagnostic tests. This is normal and does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete. A healthy state is indicated by a steady green light.

LED indicators

All the LEDs are located on the port side (Figure 7).

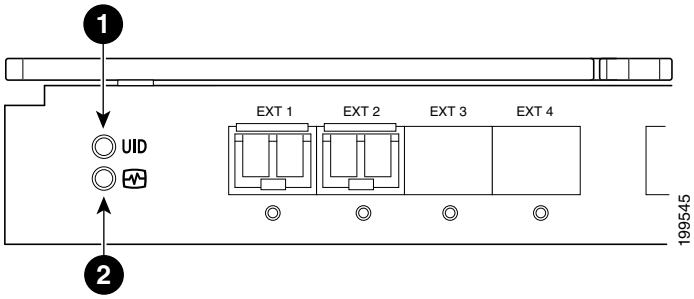


Figure 7 Identifying LEDs

1 Unit ID (UID) LED **2** Health ID LED

These LEDs are controlled by the OA and are used to indicate certain types of errors. The OA displays any errors indicated by a LED. For more information about the OA, see the *HP BladeSystem Onboard Administrator User Guide*.

LED patterns

Table 4 summarizes LED color and meaning.

Table 4 Port link status LED patterns

LED color	Status of Hardware
Solid green	Link is up.
Steady flashing green	Link is up (beacon used to identify port).
Flashing green	Link is up (traffic on port).
Solid amber	Link is disabled by software.
Flashing amber	A fault condition exists.
Off	No link.

5 Support and Other Resources

Intended audience

This guide is intended for system administrators and technicians with knowledge of:

- Configuration aspects of customer SAN fabric
- Customer host environment, such as Microsoft Windows or Linux
- CLI commands
- Cisco Fabric Manager GUI for configuring the switches through a supported web browser

Document conventions and symbols

Table 5 Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and e-mail addresses
Medium blue, underlined text (http://www.hp.com)	Website addresses
Bold font	• Key names • Text typed into a GUI element, such as into a box • GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
Italics font	Text emphasis
`Monospace font`	• File and directory names • System output • Code • Text typed at the command-line
`Monospace, italic font`	• Code variables • Command-line variables
`Monospace, bold font`	Emphasis of file and directory names, system output, code, and text typed at the command line

WARNING!
Indicates that failure to follow directions could result in bodily harm or death.

CAUTION:
Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT:
Provides clarifying information or specific instructions.

NOTE:
Provides additional information.

Contacting HP Technical Support

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

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

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

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, see the HP US service locator web page:
  http://www.hp.com/service_locator
- In the United States, for contact options see the Contact HP United States web page:
  http://welcome.hp.com/country/us/en/contact_us.html
- In other locations, see the Contact HP worldwide (in English) web page:
  http://welcome.hp.com/country/us/en/wwcontact.html
- Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, see the HP website:
  http://www.hp.com

HP Insight Remote Support Software

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable enhanced delivery of your HP Warranty, HP Care Pack Service or HP contractual support agreement. HP Insight Remote Support supplements your monitoring, 24x7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The software is available in two variants:

- HP Insight Remote Support Standard: This software supports server and storage devices and is optimized for environments with 1-50 servers. Ideal for customers who can benefit from proactive notification, but do not need proactive service delivery and integration with a management platform.
- HP Insight Remote Support Advanced: This software provides comprehensive remote monitoring and proactive service support for nearly all HP servers, storage, network, and SAN environments, plus selected non-HP servers that have a support obligation with HP. It is integrated with HP Systems Insight Manager. A dedicated server is recommended to host both HP Systems Insight Manager and HP Insight Remote Support Advanced.

Details for both versions are available at:

http://www.hp.com/go/insightremotesupport

To download the software for free, go to Software Depot:

http://www.software.hp.com

Select Insight Remote Support from the menu on the right.

Downloading Cisco NX-OS Software

Customers with a software support agreement can download the most current Cisco NX-OS software, view support entitlements, and manage release notification profiles from the HP SUM website www.itrc.hp.com/service/sum/home.do. These features are part of the support agreement available on the HP ITRC website http://www.itrc.hp.com/.

HP strongly recommends customers register with SUM and select the email notification method.

To update software:

1. Register with HP to obtain an ITRC User ID.
2. Link support agreements to an ITRC User ID from the ITRC website: www.itrc.hp.com/service/entitlements/linkSupportAgreement.do

   If you are not logged into ITRC, you are prompted to enter your ITRC User ID and password.

   NOTE: You will need the System Handle or SAID, as identified in your support agreement.

   NOTE: This step is performed once per support agreement.

3. Navigate to the SUM website to download and manage the software updates for the support agreements linked to your ITRC user ID: www.itrc.hp.com/service/sum/home.do

Subscription service

HP strongly recommends that customers register online using the Subscriber's Choice for Business website:

http://www.hp.com/go/e-updates.

Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest driver versions, and firmware documentation updates as well as instant access to numerous other product resources.

After subscribing, locate your products by selecting **Business Support** and then **Storage** under Product Category.

Related information

IMPORTANT:

For late breaking, supplemental information, access the latest version of the product release notes.

In addition to this guide, see the following documents for this product:

Cisco MDS 9000 Family Fundamentals Configuration Guide

Cisco Fabric Manager Fundamentals Configuration Guide

Cisco MDS 8GB Fabric Switch for HP BladeSystem c-Class Installation Instructions

Cisco NX-OS System Messages Reference

HP BladeSystem c7000 Enclosure Setup and Installation Guide

HP BladeSystem Onboard Administrator User Guide

HP StorageWorks SAN Design Reference Guide

Other HP websites

For additional information, see the following HP websites:

http://www.hp.com/go/storage

http://www.docs.hp.com

http://welcome.hp.com/country/us/en/prodserv/servers.html

A Technical Specifications

General specifications

Table 6 lists general specifications for the Cisco MDS 8Gb Fabric Switch.

Table 6 General specifications

Specification	Description
Configurable port types	F_Port, FL_Port, and E_Port
Media types	Small Form-Factor Pluggable (SFP) laser. 8/4/2Gb short wave up to 500 m (1,640 ft.) and 8/4/2Gb long wave up-to 10 km
EMC emissions	An operating SAN Switch conforms to the emissions requirements specified by the following regulations: • FCC Rules & Regulations, Part 15 subpart B, Class A • CSA C108.8 Class A • VCCI Class A ITE • CISPR 22 Class A • EN55022 Class A • AS/NZF 3548: 1995 Class A • CNS13438 Class A • ICES-003 Class A • Korean EMC Requirements • BSMI Standard CNS 13438 • EMC Directive 89/336/EEC • EN5022 Level A • EN50082-2/EN55024: 1998
EMC immunity	• IEC 61000-4-2 Severity Level 3 for Electrostatic Discharge • IEC 61000-4-3 Severity Level 3 for Radiated Fields • IEC 61000-4-4 Severity Level 3 for Fast Transients • IEC 61000-4-5 Severity Level 3 for Surge Voltage • IEC 61000-4-6 Conducted Emissions • IEC 61000-4-11 Voltage Variations • EN 61000-4-12 Oscillatory Waves Immunity • EN 61000-3-2 Limits for Harmonic Current Emissions • EN 61000-3-3 JEIDA
System architecture	Nonblocking shared-memory switch
ANSI protocol	FC-PH (FC Physical and Signalling Interface standard)
Modes of operation	FC Class 2, Class 3, and Class F
Maximum frame size	2112-byte
Port-to-port latency	1.2 ì sec. with no contention, cut-through routing at 8-Gb. Latency increases as input port speed increases and becomes disparate from output port speed.

Weight and physical dimensions

Table 7 lists physical properties.

Table 7 Physical dimensions

Dimension	Measurement
Height	29.3 mm (1.15 in)
Width	208 mm (8.19 in)
Depth	280 mm (11.02 in)
Weight	1.27 kg (2.8 lb)

Environmental requirements

To ensure proper operation, the switch must not be subjected to environmental conditions beyond those for which it was tested. The ranges specified in Table 8 on page 32 list the acceptable environment for both operating and non-operating conditions.

Table 8 Environmental requirements

Condition	Acceptable range during operation	Acceptable range during non-operation
Ambient temperature	104°F/40°C at sea level, derated 34°F/1°C per 1000 ft above sea level	-40°F/-40°C to 58°F/70°C with maximum rate of change of 68°F/20°C /hr
Humidity	5% to 90% relative humidity, non-condensing	50% to 80% relative humidity, non-condensing
Altitude	0 to 10,000 ft (3 km) above sea level	0 to 40,000 ft (12 km) above sea level
Shock	40 G, 2mS duration	140 G, 2mS duration
Vibration	0.5 G, 10 to 500 Hz	2.0 G, 5 to 500 Hz
Airflow	47 cubic ft per minute	None required

Supported SFPs

Do not use unsupported SFPs; they can affect switch operability. They may not fit correctly and may void your warranty. See "Optional hardware" on page 10 for a list of supported SFPs.

For a complete list of supported devices, see the HP StorageWorks Single Point of Connectivity Knowledge (SPOCK) website at

http://www.hp.com/storage/spock

You must sign up for an HP Passport to be granted access.

Supported HBAs

For a list of HBAs that have been tested and are known to work with the SAN switches, see the HP StorageWorks Single Point of Connectivity Knowledge (SPOCK) website at

http://www.hp.com/storage/spock.

You must sign up for an HP Passport to be granted access.

B Regulatory Compliance and Safety

Regulatory compliance notices

Federal Communications Commission notice for Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, see:

http://www.hp.com

For questions regarding this FCC declaration, contact us by mail or telephone:

Hewlett-Packard Company
P.O. Box 692000, Mailstop 510101
Houston, TX 77269–2000
1–281–514–3333

To identify this product, find the part, Regulatory Model Number, or product number located on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique Regulatory Model Number (RMN). You can find the RMN on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this RMN, which should not be confused with the marketing name or model number of the product.

The Regulatory Model Number for the switch is:

HSTNS-1B10

Laser device

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light.

Laser safety warning

⚠ WARNING!

To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only HP authorized service technicians to repair the laser device.

Certification and classification information

This product contains a laser internal to the fiber optic (FO) transceiver for connection to the Fibre Channel communications port.

In the USA, the FO transceiver is certified as a Class 1 laser product conforming to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. A label on the plastic FO transceiver housing indicates the certification.

Outside the USA, the FO transceiver is certified as a Class 1 laser product conforming to the requirements contained in IEC 825–1:1993 and EN 60825–1:1994, including Amendment 11:1996 and Amendment 2:2001.

Laser product label

The optional label or equivalent may be located on the surface of the HP supplied laser device. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.

International notices and statements

Canadian notice (avis Canadien)

Class A equipment

This Class A Digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union notice

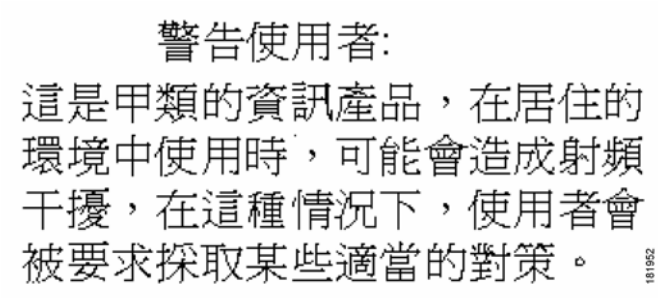
Products bearing the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1995/5/EC).

Compliance with these directives implies conformity to the following European Norms (the equivalent international standards and regulations are in parentheses):

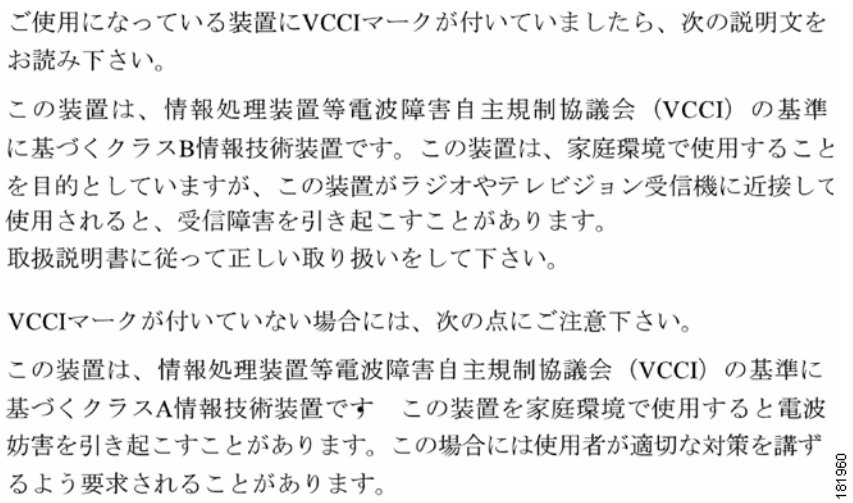
- EN55022 (CISPR 22) – Electromagnetic Interference

- EN55024 (IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5,
- IEC61000-4-6, IEC61000-4-8, IEC61000-4-11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) — Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) — Power Line Flicker
- EN60950 (IEC60950) — Product Safety
- Also approved under UL 60950/CSA C22.2 No. 60950–00, Safety of Information Technology Equipment.

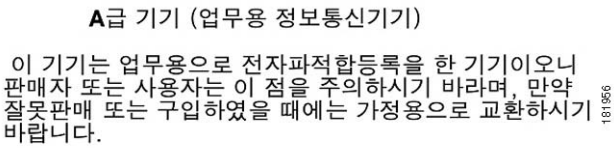
BSMI notice

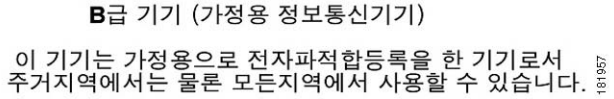


Japanese notice



Korean notices





Safety

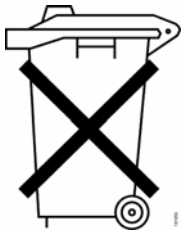
Battery replacement notice

Replacement is to be done by an HP authorized service provider using the HP spare part designated for this product. For more information about battery replacement or proper disposal, contact an HP authorized service provider.

⚠ WARNING!

The switch contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 140°F (60 °C).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the HP spare part designated for this product.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents. For more information about battery replacement or proper disposal, contact an HP authorized reseller or service provider.

Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, givaway, or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Japanese power cord statement

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Electrostatic discharge

Preventing electrostatic discharge

To prevent damage to the system, you must follow certain precautions when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always make sure you are properly grounded when touching a static-sensitive component or assembly.

Grounding methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or static-dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP authorized reseller install the part.

NOTE:
For more information on static electricity, or for assistance with product installation, contact your HP authorized reseller.

Waste Electrical and Electronic Equipment directive

Disposal of waste equipment by users in private households in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Dutch notice

Verwijdering van afgedankte apparatuur door privé-gebruikers in de Europese Unie

Dit symbool op het product of de verpakking geeft aan dat dit product niet mag worden gedeponeerd bij het normale huishoudelijke afval. U bent zelf verantwoordelijk voor het inleveren van uw afgedankte apparatuur bij een inzamelingspunt voor het recyclen van oude elektrische en elektronische apparatuur. Door uw oude apparatuur apart aan te bieden en te recyclen, kunnen natuurlijke bronnen worden behouden en kan het materiaal worden hergebruikt op een manier waarmee de volksgezondheid en het milieu worden beschermd. Neem contact op met uw gemeente, het afvalinzamelingsbedrijf of de winkel waar u het product hebt gekocht voor meer informatie over inzamelingspunten waar u oude apparatuur kunt aanbieden voor recycling.

Czechoslovakian notice

Likvidace zařízení soukromými domácími uživateli v Evropské unii

Tento symbol na produktu nebo balení označuje výrobek, který nesmí být vyhozen spolu s ostatním domácím odpadem. Povinností uživatele je předat takto označený odpad na předem určené sběrné místo pro recyklaci elektrických a elektronických zařízení. Okamžité třídění a recyklace odpadu pomůže uchovat přírodní prostředí a zajistí takový způsob recyklace, který ochrání zdraví a životní prostředí člověka. Další informace o možnostech odevzdání odpadu k recyklaci získáte na příslušném obecním nebo městském úřadě, od firmy zabývající se sběrem a svozem odpadu nebo v obchodě, kde jste produkt zakoupili.

Estonian notice

Seadmete jäätmete kõrvaldamine eramajapidamistes Euroopa Liidus

See tootel või selle pakendil olev sümbol näitab, et kõnealust toodet ei tohi koos teiste majapidamisjäätmetega kõrvaldada. Teie kohus on oma seadmete jäätmed kõrvaldada, viies need elektri- ja elektroonikaseadmete jäätmete ringlussevõtmiseks selleks ettenähtud kogumispunkti. Seadmete jäätmete eraldi kogumine ja ringlussevõtmine kõrvaldamise ajal aitab kaitsta loodusvarasid ning tagada, et ringlussevõtmine toimub viisil, mis kaitseb inimeste tervist ning keskkonda. Lisateabe saamiseks selle kohta, kuhu oma seadmete jäätmed ringlussevõtmiseks viia, võtke palun ühendust oma kohaliku linnakantselei, majapidamisjäätmete kõrvaldamise teenistuse või kauplusega, kust Te toote ostsite.

Finnish notice

Laitteiden hävittäminen kotitalouksissa Euroopan unionin alueella

Jos tuotteessa tai sen pakkauksessa on tämä merkki, tuotetta ei saa hävittää kotitalousjätteiden mukana. Tällöin hävitettävä laite on toimitettava sähkölaitteiden ja elektronisten laitteiden kierrätyspisteeseen. Hävitettävien laitteiden erillinen käsittely ja kierrätys auttavat säästämään luonnonvaroja ja varmistamaan, että laite kierrätetään tavalla, joka estää terveyshaitat ja suojelee luontoa. Lisätietoja paikoista, joihin hävitettävät laitteet voi toimittaa kierrätettäväksi, saa ottamalla yhteyttä jätehuoltoon tai liikkeeseen, josta tuote on ostettu.

French notice

Élimination des appareils mis au rebut par les ménages dans l'Union européenne

Le symbole apposé sur ce produit ou sur son emballage indique que ce produit ne doit pas être jeté avec les déchets ménagers ordinaires. Il est de votre responsabilité de mettre au rebut vos appareils en les déposant dans les centres de collecte publique désignés pour le recyclage des équipements électriques et électroniques. La collecte et le recyclage de vos appareils mis au rebut indépendamment du reste des déchets contribue à la préservation des ressources naturelles et garantit que ces appareils seront recyclés dans le respect de la santé humaine et de l'environnement. Pour obtenir plus d'informations sur les centres de collecte et de recyclage des appareils mis au rebut, veuillez contacter les autorités locales de votre région, l es services de collecte des ordures ménagères ou le magasin dans lequel vous avez acheté ce produit.

German notice

Entsorgung von Altgeräten aus privaten Haushalten in der EU

Das Symbol auf dem Produkt oder seiner Verpackung weist darauf hin, dass das Produkt nicht über den normalen Hausmüll entsorgt werden darf. Benutzer sind verpflichtet, die Altgeräte an einer Rücknahmestelle für Elektro- und Elektronik-Altgeräte abzugeben. Die getrennte Sammlung und ordnungsgemäße Entsorgung Ihrer Altgeräte trägt zur Erhaltung der natürlichen Ressourcen bei und garantiert eine Wiederverwertung, die die Gesundheit des Menschen und die Umwelt schützt. Informationen dazu, wo Sie Rücknahmestellen für Ihre Altgeräte finden, erhalten Sie bei Ihrer Stadtverwaltung, den örtlichen Müllentsorgungsbetrieben oder im Geschäft, in dem Sie das Gerät erworben haben.

Greek notice

Απόρριψη άχρηστου εξοπλισμού από χρήστες σε ιδιωτικά νοικοκυριά στην Ευρωπαϊκή Ένωση

Το σύμβολο αυτό στο προϊόν ή τη συσκευασία του υποδεικνύει ότι το συγκεκριμένο προϊόν δεν πρέπει να διατίθεται μαζί με τα άλλα οικιακά σας απορρίμματα. Αντίθετα, είναι δική σας ευθύνη να απορρίψετε τον άχρηστο εξοπλισμό σας παραδίδοντάς τον σε καθορισμένο σημείο συλλογής για την ανακύκλωση άχρηστου ηλεκτρικού και ηλεκτρονικού εξοπλισμού. Η ξεχωριστή συλλογή και ανακύκλωση του άχρηστου εξοπλισμού σας κατά την απόρριψη θα συμβάλει στη διατήρηση των φυσικών πόρων και θα διασφαλίσει ότι η ανακύκλωση γίνεται με τρόπο που προστατεύει την ανθρώπινη υγεία και το περιβάλλον. Για περισσότερες πληροφορίες σχετικά με το πού μπορείτε να παραδώσετε τον άχρηστο εξοπλισμό σας για ανακύκλωση, επικοινωνήστε με το αρμόδιο τοπικό γραφείο, την τοπική υπηρεσία διάθεσης οικιακών απορριμμάτων ή το κατάστημα όπου αγοράσατε το προϊόν.

Hungarian notice

Készülékek magánháztartásban történő selejtezése az Európai Unió területén

A készüléken, illetve a készülék csomagolásán látható azonos szimbólum annak jelzésére szolgál, hogy a készülék a selejtezés során az egyéb háztartási hulladéktól eltérő módon kezelendő. A vásárló a hulladékká vált készüléket köteles a kijelölt gyűjtőhelyre szállítani az elektromos és elektronikai készülékek újrahasznosítása céljából. A hulladékká vált készülékek selejtezéskori begyűjtése és újrahasznosítása hozzájárul a természeti erőforrások megőrzéséhez, valamint biztosítja a selejtezett termékek környezetre és emberi egészségre nézve biztonságos feldolgozását. A begyűjtés pontos helyéről bővebb tájékoztatást a lakhelye szerint illetékes önkormányzattól, az illetékes szemeteltakarító vállalattól, illetve a terméket elárusító helyen kaphat.

Italian notice

Smaltimento delle apparecchiature da parte di privati nel territorio dell'Unione Europea

Questo simbolo presente sul prodotto o sulla sua confezione indica che il prodotto non può essere smaltito insieme ai rifiuti domestici. È responsabilità dell'utente smaltire le apparecchiature consegnandole presso un punto di raccolta designato al riciclo e allo smaltimento di apparecchiature elettriche ed elettroniche. La raccolta differenziata e il corretto riciclo delle apparecchiature da smaltire permette di proteggere la salute degli individui e l'ecosistema. Per ulteriori informazioni relative ai punti di raccolta delle apparecchiature, contattare l'ente locale per lo smaltimento dei rifiuti, oppure il negozio presso il quale è stato acquistato il prodotto.

Latvian notice

Nolietotu iekārtu iznīcināšanas noteikumi lietotājiem Eiropas Savienības privātajās mājsaimniecībās

Šāds simbols uz izstrādājuma vai uz tā iesaiņojuma norāda, ka šo izstrādājumu nedrīkst izmest kopā ar citiem sadzīves atkritumiem. Jūs atbildat par to, lai nolietotās iekārtas tiktu nodotas speciāli iekārtotos punktos, kas paredzēti izmantoto elektrisko un elektronisko iekārtu savākšanai otrreizējai pārstrādei. Atsevišķa nolietoto iekārtu savākšana un otrreizējā pārstrāde palīdzēs saglabāt dabas resursus un garantēs, ka šīs iekārtas tiks otrreizēji pārstrādātas tādā veidā, lai pasargātu vidi un cilvēku veselību. Lai uzzinātu, kur nolietotās iekārtas var izmest otrreizējai pārstrādei, jāvēršas savas dzīves vietas pašvaldībā, sadzīves atkritumu savākšanas dienestā vai veikalā, kurā izstrādājums tika nopirkts.

Lithuanian notice

Vartotojų iš privačių namų ūkių į rangos atliekų šalinimas Europos Sąjungoje

Šis simbolis ant gaminio arba jo pakuotės rodo, kad šio gaminio šalinti kartu su kitomis namų ūkio atliekomis negalima. Šalintinas į rangos atliekas privalote pristatyti į specialią surinkimo vietą elektros ir elektroninės į rangos atliekoms perdirbti. Atskirai surenkamos ir perdirbamos šalintinos į rangos atliekos padės saugoti gamtinius išteklius ir užtikrinti, kad jos bus perdirbtos tokiu būdu, kuris nekenkia žmonių sveikatai ir aplinkai. Jeigu norite sužinoti daugiau apie tai, kur galima pristatyti perdirbtinas į rangos atliekas, kreipkitės į savo seniūniją, namų ūkio atliekų šalinimo tarnybą arba parduotuvę, kurioje į sigijote gaminį .

Polish notice

Pozbywanie się zużytego sprzętu przez użytkowników w prywatnych gospodarstwach domowych w Unii Europejskiej

Ten symbol na produkcie lub jego opakowaniu oznacza, że produktu nie wolno wyrzucać do zwyk ych pojemników na śmieci. Obowiązkiem użytkownika jest przekazanie zużytego sprzętu do wyznaczonego punktu zbiórki w celu recyklingu odpadów powsta ych ze sprzętu elektrycznego i elektronicznego. Osobna zbiórka oraz recykling zużytego sprzętu pomogą w ochronie zasobów naturalnych i zapewnią ponowne wprowadzenie go do obiegu w sposób chroniący zdrowie cz owieka i środowisko. Aby uzyskać więcej informacji o tym, gdzie można przekazać zużyty sprzęt do recyklingu, należy się skontaktować z urzędem miasta, zak adem gospodarki odpadami lub sklepem, w którym zakupiono produkt.

Portuguese notice

Descarte de Lixo Elétrico na Comunidade Européia

Este símbolo encontrado no produto ou na embalagem indica que o produto não deve ser descartado no lixo doméstico comum. É responsabilidade do cliente descartar o material usado (lixo elétrico), encaminhando-o para um ponto de coleta para reciclagem. A coleta e a reciclagem seletivas desse tipo de lixo ajudarão a conservar as reservas naturais; sendo assim, a reciclagem será feita de uma forma segura, protegendo o ambiente e a saúde das pessoas. Para obter mais informações sobre locais que reciclam esse tipo de material, entre em contato com o escritório da HP em sua cidade, com o serviço de coleta de lixo ou com a loja em que o produto foi adquirido.

Slovakian notice

Likvidácia vyradených zariadení v domácnostiach v Európskej únii

Symbol na výrobku alebo jeho balení označuje, že daný výrobok sa nesmie likvidovať s domovým odpadom. Povinnosťou spotrebiteľa je odovzdať vyradené zariadenie v zbernom mieste, ktoré je určené na recykláciu vyradených elektrických a elektronických zariadení. Separovaný zber a recyklácia vyradených zariadení prispieva k ochrane prírodných zdrojov a zabezpečuje, že recyklácia sa vykonáva spôsobom chrániacim ľudské zdravie a životné prostredie. Informácie o zberných miestach na recykláciu vyradených zariadení vám poskytne miestne zastupiteľstvo, spoločnosť zabezpečujúca odvoz domového odpadu alebo obchod, v ktorom ste si výrobok zakúpili.

Slovenian notice

Odstranjevanje odslužene opreme uporabnikov v zasebnih gospodinjstvih v Evropski uniji

Ta znak na izdelku ali njegovi embalaži pomeni, da izdelka ne smete odvreči med gospodinjske odpadke. Nasprotno, odsluženo opremo morate predati na zbirališče, pooblaščeno za recikliranje odslužene električne in elektronske opreme. Ločeno zbiranje in recikliranje odslužene opreme prispeva k ohranjanju naravnih virov in zagotavlja recikliranje te opreme na zdravju in okolju neškodljiv način. Za podrobnejše informacije o tem, kam lahko odpeljete odsluženo opremo na recikliranje, se obrnite na pristojni organ, komunalno službo ali trgovino, kjer ste izdelek kupili.

Spanish notice

Eliminación de residuos de equipos eléctricos y electrónicos por parte de usuarios particulares en la Unión Europea

Este símbolo en el producto o en su envase indica que no debe eliminarse junto con los desperdicios generales de la casa. Es responsabilidad del usuario eliminar los residuos de este tipo depositándolos en un "punto limpio" para el reciclado de residuos eléctricos y electrónicos. La recogida y el reciclado selectivos de los residuos de aparatos eléctricos en el momento de su eliminación contribuirá a conservar los recursos naturales y a garantizar el reciclado de estos residuos de forma que se proteja el medio ambiente y la salud. Para obtener más información sobre los puntos de recogida de residuos eléctricos y electrónicos para reciclado, póngase en contacto con su ayuntamiento, con el servicio de eliminación de residuos domésticos o con el establecimiento en el que adquirió el producto.

Swedish notice

Bortskaffande av avfallsprodukter från användare i privathushåll inom Europeiska Unionen

Om den här symbolen visas på produkten eller förpackningen betyder det att produkten inte får slängas på samma ställe som hushållssopor. I stället är det ditt ansvar att bortskaffa avfallet genom att överlämna det till ett uppsamlingsställe avsett för återvinning av avfall från elektriska och elektroniska produkter. Separat insamling och återvinning av avfallet hjälper till att spara på våra naturresurser och gör att avfallet återvinns på ett sätt som skyddar människors hälsa och miljön. Kontakta ditt lokala kommunkontor, din närmsta återvinningsstation för hushållsavfall eller affären där du köpte produkten för att få mer information om var du kan lämna ditt avfall för återvinning.

Glossary

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

AL_PA Arbitrated loop physical address. A unique 8-bit value assigned during loop initialization to a port in an arbitrated loop. See also non-participating mode.

alias server A fabric software facility that supports multicast group management.

API Application programming interface. A defined protocol that allows applications to interface with a set of services.

arbitrated loop A shared 100 Mb/s Fibre Channel transport structured as a loop. Can support up to 126 devices and one fabric attachment. See also public device, public loop.

AW_TOV Arbitration wait time-out value. The minimum time an arbitrating L_Port waits for a response before beginning loop initialization.

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

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

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

buffer-to-buffer flow control Management of the frame transmission rate in either a point-to-point topology or an arbitrated loop. See also arbitrated loop, point-to-point, topology.

CLI Command line interface. Depends entirely on the use of commands, such as through telnet or SNMP, and does not involve a GUI.

compact flash Flash (temporary) memory that is used in a manner similar to hard disk storage. It is connected to a bridging component that connects to the PCI bus of the processor. Not visible within the memory space of the processor.

configuration The way a system is set up. May refer to hardware or software:

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

CRC Cyclic redundancy check. A check for transmission errors that is included in every data frame.

data word A type of transmission word that occurs within frames. The frame header, data field, and CRC all consist of data words.

defined zone configuration The set of all zone objects defined in the fabric. May include multiple zone configurations. See also zone, zone configuration.

directory service See SNS.

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

domain ID Unique identifier used in routing frames for all switches in a fabric. Usually assigned by the principal switch, but can be assigned manually. The domain ID for an HP switch can be any integer between 1 and 239. The default domain ID is usually 1.

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

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

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

EIA rack An equipment storage rack that meets the standards set by the EIA (Electronics Industry Association).

enabled zone configuration The currently enabled configuration of zones. Only one configuration can be enabled at a time. See also zone, zone configuration.

end-to-end flow control A facility that governs flow of class 1 and class 2 frames between N_Ports.

error With respect to FC, a missing or corrupted frame, time-out, loss of synchronization, or loss of signal (link error).

exchange The highest-level FC mechanism used for communication between N_Ports. Composed of one or more related sequences; can work in one or both directions.

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

fabric An FC network containing two or more switches in addition to hosts and devices. May also be called a switched fabric.

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

FCIA Fibre Channel Industry Association. An international organization of FC industry professionals. Provides oversight of ANSI and industry standards.

FCP Fibre Channel Protocol. Mapping of protocols onto the FC standard protocols. For example, SCSI FCP maps SCSI-3 onto FC.

FCS switch Fabric Configuration Server switch. One or more designated HP switches that store and manage the configuration and security parameters for all switches in the fabric.

Fibre Channel The primary protocol for building SANs to transmit data between servers, switches, and storage devices. Unlike IP and Ethernet, Fibre Channel is designed to support the needs of storage devices of all types. It is a high-speed, serial, bidirectional, topology-independent protocol, and is a highly scalable interconnection between computers, peripherals, and networks.

fill word An IDLE or ARB ordered set that is transmitted during breaks between data frames to keep the link active.

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

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

frame The Fibre Channel structure used to transmit data between ports. Consists of a start-of-frame delimiter, header, optional headers, data payload, cyclic redundancy check, and end-of-frame delimiter. There are two types of frames: link control frames and data frames. See also packet.

FRU Field-replaceable unit. A component that can be replaced on site.

FS Fibre Channel Service. A service that is defined by FC standards and exists at a well-known address. The Simple Name Server, for example, is an FC service. See also SNS.

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

FSPF Fabric shortest path first. HP routing protocol for FC switches.

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

G_Port	Generic port. A port that can operate as an E_Port or F_Port. A port is defined as a G_Port when it is not yet connected or has not yet assumed a specific function in the fabric. See also **E_Port**, F_Port, U_Port.
hard address	The AL_PA that an NL_Port attempts to acquire during loop initialization. See also defined zone configuration.
idle	Continuous transmission of an ordered set over an FC link when no data is being transmitted, to keep the link active and maintain bit, byte, and word synchronization.
integrated fabric	The fabric created by connecting multiple HP switches with multiple ISL cables, and configuring the switches to handle traffic as a seamless group.
ISL trunking	The distribution of traffic over the combined bandwidth of multiple ISLs. A set of trunked ISLs is called a trunking group; the ports in a trunking group are called trunking ports.
isolated E_Port	An E_Port that is online but not operational due to overlapping domain IDs or nonidentical parameters (such as E_D_TOVs). See also E_D_TOV.
ITRC	IT Resource Center.
K28.5	A special 10-bit character that indicates the beginning of a transmission word that performs FC control and signaling functions. The first seven bits are the common pattern.
kernel flash	Flash (temporary) memory connected to the peripheral bus of the processor and visible within the memory space of the processor. Also called user flash.
L_Port	Loop port. A node loop port (NL_Port) or fabric loop port (FL_Port) that has arbitrated loop capabilities. An L_Port can be in one of two modes: • Fabric mode: Connected to a port that is not loop capable and is using fabric protocol. • Loop mode: In an arbitrated loop and using loop protocol. An L_Port in loop mode can also be in participating mode or non-participating mode. See also non-participating mode.
latency	The time required to transmit a frame from the time it is sent until it arrives. Together, latency and bandwidth define the speed and capacity of a link or system.
link	With respect to FC, a physical connection between two ports, consisting of both transmit and receive fibers.
link services	A protocol for link-related actions.
LIP	Loop initialization primitive. The signal that begins initialization in a loop. It indicates either loop failure or the resetting of a node.
LM_TOV	Loop master time-out value. The minimum time that the loop master waits for a loop initialization sequence to return.
loop failure	Loss of signal within a loop for any period of time; loss of synchronization for longer than the time-out value.
Loop_ID	A hexadecimal value representing one of the 127 possible AL_PA values in an arbitrated loop. See also AL_PA.
loop initialization	The logical procedure used by an L_Port to discover its environment. Can be used to assign AL_PA addresses, detect loop failure, or reset a node. See also AL_PA.
LPSM	Loop port state machine. The logical entity that performs arbitrated loop protocols and defines the behavior of L_Ports when they require access to an arbitrated loop. See also L_Port.
LWL	Long wavelength. A type of fiber optic cabling that is based on 1300 mm lasers and supports link speeds up to 2 Gb/s. May also refer to the type of transceiver. See also SWL.
master port	The port that determines the routing paths for all traffic flowing through a trunking group. One of the ports in the first ISL in the trunking group is designated as the master port for that group. See also ISL trunking.

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

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

N_Port Node port. A port on a node that can connect to an FC port or to another N_Port in a point-to-point connection.

name server A term frequently used to indicate a Simple Name Server (SNS). See also SNS.

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

node An FC device that contains an N_Port or NL_Port.

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

Nx_Port A node port that can operate as an N_Port or NL_Port.

Onboard Administrator (OA) The HP BladeSystem Onboard Administrator (OA) is the enclosure management processor, subsystem, and firmware base used to support the HP BladeSystem c7000 and all the managed devices contained within the enclosure.

packet A set of information transmitted across a network.

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

path selection The selection of a transmission path through the fabric. HP switches use the FSPF protocol for transmission path selection.

phantom address An AL_PA value assigned to a device that is not physically in the loop. Also known as phantom AL_PA. See also **AL_PA**, phantom device.

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

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

point-to-point An FC topology that employs direct links between each pair of communicating entities. See also buffer-to-buffer flow control.

port cage The metal casing extending out of the FC port on the switch and into which a GBIC or SFP transceiver can be inserted.

Port_Name The unique identifier assigned to an FC port. It is communicated during login and port discovery.

POST Power-on self-test. A series of diagnostic tests run by a switch after it is powered on.

primary FCS switch Primary Fabric Configuration Server switch. The switch that actively manages the configuration and security parameters for all switches in the fabric.

private loop An arbitrated loop that does not include a participating FL_Port.

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

public device A device that supports arbitrated loop protocol, can interpret 8-bit addresses, and can log in to the fabric. See also arbitrated loop.

public loop An arbitrated loop that includes a participating FL_Port and may contain both public and private NL_Ports. See also arbitrated loop.

public NL_Port An NL_Port that logs in to the fabric, can function within a public or private loop, and can communicate with private or public NL_Ports. See also private loop.

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

R_A_TOV Resource allocation time-out value. The maximum time a frame can be delayed in the fabric and still be delivered.

RAID	Redundant Array of Independent Disks. A collection of disk drives that appear as a single volume to the server and are fault tolerant through mirroring or parity checking.
request rate	The rate at which requests arrive at a servicing entity.
route	With respect to a fabric, the communication path between two switches. May also apply to the specific path taken by an individual frame from source to destination.
routing	The assignment of frames to specific switch ports according to frame destination.
RR_TOV	Resource recovery time-out value. The minimum time a target device in a loop waits after a LIP before logging out a SCSI initiator.
RSCN	Registered state change notification. A switch function that allows notification of fabric changes to be sent from the switch to the specified nodes.
SAID	Service Agreement Identifier.
SAN	Storage area network. A network of systems and storage devices that communicate using FC protocols.
SD_Port	In SPAN destination port (SD port) mode, an interface functions as a switched port analyzer (SPAN)
SDRAM	Synchronous dynamic random access memory. The main memory for a switch. See also switch.
sequence	A group of related frames transmitted in the same direction between two N_ports.
service rate	The rate at which an entity can service requests.
SFP	Small form-factor pluggable optical transceiver.
single mode	The fiber optic cabling standard that corresponds to distances up to 10 km between devices.
SNMP	Simple Network Management Protocol. An Internet management protocol that uses either IP for network-level functions and UDP for transport functions, or TCP/IP for both. SNMP can be made available over other protocols (such as UDP/IP) because it does not rely on the underlying communication protocols. See also MIB, trap (SNMP).
SNS	Simple Name Server. A switch service that stores names, addresses, and attributes for up to 15 minutes, and provides them as required to other devices in the fabric. May also be referred to as a directory service.
SUM	Software Update Manager.
switch	Hardware that routes frames according to FC protocol and is controlled by software.
switch port	A port on a switch. Switch ports can be E_Ports, F_Ports, or FL_Ports.
switched fabric	A network topology where devices connect to each other through Fibre Channel switches.
SWL	Short wavelength. A type of fiber optic cabling that is based on 850 mm lasers and supports link speeds up to 2 Gb/s. May also refer to the type of transceiver. See also LWL.
TE_Port	A trunking expansion port.
tenancy	The time span that begins when a port wins arbitration in a loop and ends when the same port returns to the monitoring state. Also called loop tenancy.
throughput	The rate of data flow achieved within a cable, link, or system. Usually measured in bits per second (b/s).
topology	With respect to FC, the configuration of the FC network and the resulting communication paths allowed. There are three possible topologies: • Point-to-point: A direct link between two communication ports • Switched fabric: Multiple N_Ports linked to a switch by F_Ports • Arbitrated loop: Multiple NL_Ports connected in a loop
transmission character	A 10-bit character encoded according to the rules of the 8b/10b algorithm.

transmission word A group of transmission characters.

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

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

well-known address With respect to FC, a logical address defined by the FC standards as assigned to a specific function and stored on the switch.

workstation A computer used to access and manage the fabric. May also be called a management station or host.

WWN World wide name. An identifier that is unique worldwide. Each entity in a fabric has a distinct WWN.

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

zone configuration A specified set of zones. Enabling a configuration authorizes all zones in that configuration. See also defined zone configuration,enabled zone configuration.

zoning Zoning enables you to set up access control between storage devices or user groups. If you have administrator privileges in your fabric, you can create zones to increase network security and to prevent data loss or corruption. Zoning is enforced by examining the source-destination ID field.

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