

Element Manager User Guide



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Part Number 391192-001

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Preface

This document is a guide to the Element Manager Java-based graphical user interface (GUI) that runs on your switch. This document explains how to use Element Manager and provides the steps that you need to perform to configure your switch with the GUI.

Intended Audience

The intended audience is the administrator responsible for installing, configuring, and managing Infiniband equipment. This administrator should have experience administering similar networking or storage equipment.

Typographical Conventions

The following typographic conventions are used in this guide to provide visual clues as to the purpose or application of specific text.

- **Bold** text indicates a command or keyword, or text that appears in your display.
- *Italics* indicate variables that you replace with an actual value.
- Square brackets ([,]) indicate an optional argument that you choose to include or exclude when you enter a command.
- Pipe character (|) indicates an “or” choice. For example, “**a | b**” indicates “a or b.”
- Ellipses (...) indicate truncated text. You will see these in long examples depicting terminal output that is too long to be shown in its entirety.



NOTE: Indicates an important point or aspect that you need to consider before continuing.

Contact Information

Table 2-1: Customer Contact Information

For the name of your nearest authorized HP reseller:	In the United States, call 1-800-345-1518. In Canada, call 1-800-263-5868. Outside the United States and Canada, refer to www.hp.com .
For HP technical support	In the United States and Canada, 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. Outside the United States and Canada, refer to www.hp.com .

About Element Manager

The following sections appear in this chapter:

- [“Introduction” on page 1](#)
- [“Anatomy of Element Manager” on page 1](#)
- [“Installing Element Manager” on page 4](#)
- [“Launching Element Manager” on page 4](#)

Introduction

With Element Manager (EM), you can manage individual switches from an easy-to-use GUI. To run EM, you must:

1. Install the EM software on a host or workstation.
2. Configure your switch(es) to support EM.
3. Launch EM on your host or workstation.

Anatomy of Element Manager

The primary display of EM provides nine pulldown menus, nine feature buttons, and various selectable display elements that vary by switch platform. [Table 1-1](#) and [Table 1-2](#) list and describe the menus and buttons. Selectable display elements vary by hardware platform.

When you select a display element (such as switch ports), a yellow border appears around the element:

1. Double-click any selectable element to open a related configuration window:
2. Right-click these elements to view element-specific right-click menus.
3. Use these menus and windows to view element details or change the configuration.



NOTE: You can hold the **Ctrl** button and select multiple elements of the same type to configure them as a group [for example, multiple InfiniBand (IB) ports]. After you select multiple like elements, right-click one of the elements to display a right-click menu for options that you can apply.

Table 1-1 lists and describes the pulldown menus on the EM display.

Table 1-1: Element Manager Pulldown Menus

Menu	Description
File	Use the menu items in the File menu to: <ul style="list-style-type: none"> Load a switch in the EM display. Configure EM performance preferences. Refresh the EM display. Telnet to the open switch to configure the switch with the CLI. (For CLI details, refer to the <i>HP 24-Port 4x Fabric Copper Switch Command Line Interface Reference Guide</i>.)
Edit	Use the Edit menu to view port properties or card properties.
Maintenance	Use the menu items in the Maintenance menu to: <ul style="list-style-type: none"> View switch details. View and configure basic services. View and configure the boot configuration. Back-up the running configuration. Import and export files. Reboot the switch. Track diagnostic tests.
Health	Use the menu items in the Health menu to monitor switch status and events.
Report	Use the menu items in the Report menu to graph switch statistics.
InfiniBand	Use the menu items in the InfiniBand menu to configure IB-specific switch features, including the Device Manager and Subnet Manager (SM).
Ethernet	Use the menu items in the Ethernet menu to configure Ethernet-specific switch features.
Fibre Channel	Use the menu items in the FibreChannel menu to configure FC-specific switch features.
Help	Use the menu items in the Help menu to launch on-line help and locate additional help resources.

Table 1-2 lists and describes the feature buttons on the EM display.

Table 1-2: Element Manager Feature Buttons










Button	Description
Open 	Click the Open button to load a different switch in the EM display.
Refresh 	Click the Refresh button to poll the switch and update the EM display.

Table 1-2: Element Manager Feature Buttons (Continued)

Button	Description
Telnet 	Click the Telnet button to launch a telnet session to the switch.
Help 	Click the Help button to launch EM on-line help.
Properties 	After selecting an element (or multiple elements of the same type), click the Properties button to view the properties of the element(s).
Graph 	After selecting an element (or multiple elements of the same type), click the Graph button to select element statistics you want to graph.
Topology 	Click the Topology button to view the switch and neighboring devices.
Subnet Management 	Click the Subnet Management button to open the Subnet Management window and configure partitions, multicast groups, and other Subnet Manager-related features.
Storage Manager 	Click the Storage Manager button to open the Storage Manager window and configure initiators, targets, and LUNs.

Common GUI Buttons

Many windows that you can open in EM display a combination of frequently appearing buttons. [Table 1-3](#) lists and describes these common buttons.

Table 1-3: Common Buttons

Button	Description
Apply	Applies any changes that you made in the window to the switch.
Refresh	Updates the window with the latest information from the switch.
Close	Closes the window.
1. Help	Launches context-sensitive on-line help.

Status Indicators

The EM display uses specific colors to communicate the status of switch elements.

Table 1-4: Status Indicator Colors

Color	Indication
gray	Element is not active (for example, an IB port that does not connect to a cable).
red	An administrator has taken the element offline or the element experiences an error.
green	Element functions successfully.
transparent	Element is unmanaged.

Installing Element Manager

EM runs on Linux and Windows platforms. Follow installation instructions for the appropriate platform.

System Requirements (All Platforms)

To install EM, your system must meet the following requirements:

- 64 MB of available RAM
- 75 MB of available hard disk space and 50 MB of additional available hard disk space during installation
- 300 MHz processor
- 800x600 screen resolution with 16-bit color depth

Performing the Installation

To install EM:

1. Log in to the host system.
2. Download the software and documentation from the HP Web site at <http://support.hp.com>.
3. Install the software:
 - a. Unzip the tar file containing the software using gunzip.
 - b. Extract the software into a local directory using tar.
 - c. Install the software. Refer to the *HP Dual-port 4x Fabric Adapter User Guide* provided with the software for instructions.

Launching Element Manager

When you launch EM, the EM interface requests the IP address (or DNS name) of the switch that you want to manage. To successfully connect to the switch that you want to manage, you must first configure the switch to permit EM access. If EM fails to connect to the switch, verify that the switch meets the prerequisites for EM.

Preparing your Switch

Factory defaults permit your switch to connect to EM. The following settings must apply to your switch to open it in EM:

- HTTP server enabled
- telnet server enabled
- SNMP server configured

To view your switch settings:

1. Log in to your switch.
2. View the desired switch settings:
 - Enter the **enable** command to enter Privileged Exec mode.
 - Enter the **configure terminal** command to enter Global Configuration mode.
 - Enter the **ip http server** command to enable the HTTP server.
 - Enter the **telnet enable** command to enable telnet services.
 - Enter the **snmp-server** command with the following to configure an SNMP server:

- the IP address of the server that you want to configure
- (optional) the **recv-event-traps** keyword

For more details, refer to the *HP 24-Port 4x Fabric Copper Switch Command Line Interface Reference Guide*.

Chassis Display Tasks

The following sections appear in this chapter:

- [“Introduction” on page 7](#)
- [“Viewing Port Properties” on page 8](#)
- [“Viewing Serial Management Port Properties” on page 10](#)
- [“Viewing Ethernet Management Port Properties” on page 10](#)
- [“Viewing InfiniBand Management Port Properties” on page 11](#)
- [“Configuring Ports” on page 11](#)
- [“Rebooting the Switch” on page 12](#)

Introduction

When you launch EM and open a switch, a graphical display of that switch appears. Colors in the display indicate the status of various components of the switch. Various right- and left-click options let you configure the components that you see in the display.

Viewing Port Properties

To view port properties:

1. Right-click the port in the chassis display whose properties you want to view. A right-click menu appears.
2. Select **Properties...** from the right-click menu. A window opens and displays the type and number of the port in the title bar. The contents of the window vary by port type. [Table 2-1](#) lists and describes the fields in the **Properties** window of an Ethernet port.

Table 2-1: Ethernet Port Properties Window Fields

Field	Description
Port Type	Displays the port number in slot#/port# format.
Port Name	Provides a port name that you can edit and apply to the port.
Enable/Disable Port	Provides the up and down radio buttons so you can configure the administrative status of the port.
Current Port Status	Indicates whether or not the port is ready for use.
Auto Negotiation Supported	Displays true if the port supports auto-negotiation.
Enable Auto Negotiation (checkbox)	Enables or disables auto-negotiation on the port.
Set Port Speed	Provides radio buttons to let you configure the speed of the port.
Current Port Speed	Displays the speed of the port.
Set Duplex	Provides radio buttons to let you configure the duplex setting of the port.
Current Duplex	Indicates whether the port runs in full duplex mode or half duplex mode.
Enable Link Up/Down Trap	Provides enabled and disabled radio buttons to configure whether or not the port sends a trap when links go up or down.
MTU	Displays the maximum transmission unit (MTU) of the port, in bytes.
MAC Address	Displays the media access control (MAC) address of the port.
Last Changed On	Displays the time and date of the last time that a user configured the port.
Action	Lets you flush the ARP table when you click the Apply button.
Result	Displays the result of the action that you perform from the Action field.

[Table 2-2](#) lists and describes the fields in the **Properties** window of a Fibre Channel (FC) port.

Table 2-2: Fibre Channel Port Properties Window Fields

Field	Description
Port Type	Displays the port number in slot#/port# format.
Port Name	Provides a port name that you can edit and apply to the port.

Table 2-2: Fibre Channel Port Properties Window Fields

Field	Description
Enable/Disable Port	Provides the up and down radio buttons so you can configure the administrative status of the port.
Current Port Status	Indicates whether or not the port is ready for use.
Auto Negotiation Supported	Displays true if the port supports auto-negotiation.
Enable Auto Negotiation (checkbox)	Enables or disables auto-negotiation on the port.
Set Port Speed	Provides radio buttons to let you configure the speed of the port.
Current Port Speed	Displays the speed of the port.
Enable Link Up/Down Trap	Provides enabled and disabled radio buttons to configure whether or not the port sends a trap when links go up or down.
MTU	Displays the MTU of the port, in bytes.
WWNN	Worldwide node name of the HCA of the port.
WWPN	Worldwide port name of the port.
Last Changed On	Displays the time and date of the last time that a user configured the port.
Action	Lets you flush the ARP table when you click the Apply button.
Result	Displays the result of the action that you perform from the Action field.

[Table 2-3](#) lists and describes the fields in the **Properties** window of an IB port.

Table 2-3: InfiniBand Port Properties Window Fields

Field	Description
Port Type	Displays the port number in slot#/port# format.
Port Name	Provides a port name that you can edit and apply to the port.
Enable/Disable Port	Provides the up and down radio buttons so you can configure the administrative status of the port.
Current Port Status	Indicates whether or not the port is ready for use.
Auto Negotiation Supported	Displays true if the port supports auto-negotiation.
Enable Auto Negotiation (checkbox)	Enables or disables auto-negotiation on the port.
Set Port Speed	Provides radio buttons to let you configure the speed of the port.
Current Port Speed	Displays the speed of the port.
Enable Link Up/Down Trap	Provides enabled and disabled radio buttons to configure whether or not the port sends a trap when links go up or down.
MTU	Displays the MTU of the port, in bytes.
Last Changed On	Displays the time and date of the last time that a user configured the port.

Viewing Serial Management Port Properties

To view Serial Management port properties:

1. Click the **Edit** menu and select **Management Ports**. The **Management Ports** window opens.
2. Click the **Serial Port** tab. [Table 2-4](#) lists and describes the fields on this tab.

Table 2-4: Serial Management Port Window Fields

Field	Description
Baud Rate	Baud rate setting to which you must set your serial connection.
Data Bits	Data bit setting to which you must set your serial connection.
Stop Bits	Stop bit setting to which you must set your serial connection.
Parity	Parity field setting to which you must set your serial connection.

Establishing a Serial Connection

To create a serial connection to your switch:

1. Connect the straight-through M/F serial cable (provided with your switch) to the Serial Management port, then connect the cable to your terminal, workstation, or terminal server.
2. Launch a terminal session (on a workstation, use a terminal emulation application such as HyperTerminal) and configure your terminal parameters to match the parameters in [Table 2-4](#).
3. Press the **Enter** key until the **Login** prompt appears.

Viewing Ethernet Management Port Properties

To view Ethernet Management port properties:

1. Click the **Edit** menu and select **Management Ports**. The **Management Ports** window opens.
2. Click the **Ethernet Port** tab. [Table 2-5](#) lists and describes the fields on this tab.

Table 2-5: Ethernet Management Port Window Fields

Field	Description
MAC Address	MAC address of the Ethernet Management port (which serves as the MAC address of the switch).
Enable Auto Negotiation	Displays true if the Ethernet Management port dynamically determines the connection speed of the device to which it connects over via Ethernet cable; otherwise displays false .
Administrative Port Status	Displays the administrative status that you configure via the CLI with the shutdown and no shutdown commands.
Current Port Status	Displays up if the port runs successfully; displays down if the port cannot transmit and receive traffic for any reason.
IP Address	IP address of the Ethernet Management port.
Network Mask	Subnet mask of the Ethernet Management port.
Address Option	Displays the address option that you configure with the addr-option CLI command.

Viewing InfiniBand Management Port Properties

To view IB Management port properties:

1. Click the **Edit** menu and select **Management Ports**. The **Management Ports** window opens.
2. Click the **Ethernet Port** tab. Table 2-6 lists and describes the fields on this tab.

Table 2-6: InfiniBand Management Port Window Fields

Field	Description
Administrative Port Status	Displays the administrative status that you configure via the CLI with the shutdown and no shutdown commands.
Current Port Status	Displays up if the port runs successfully; displays down if the port cannot transmit and receive traffic for any reason.
IP Address	IP address of the IB Management port.
Network Mask	Subnet mask of the IB Management port.
Address Option	Displays the address option that you configure with the addr-option CLI command.

Configuring Ports

EM provides different configuration options for each type of port. The options available to each port will appear in the **Port Properties** window.



NOTE: To configure multiple ports at once, hold the **Ctrl** key and select multiple ports of the same type, then right-click one of the ports that you selected to view right-click menu options.

Configuring a Port Name

To configure the administrative name of a port:

1. Double-click the port that you want to configure. A window opens that identifies the type of the port and the port number (in slot#/port# format).
2. In the **Port Name** field of the window, enter a name for the port, then click the **Apply** button.
3. Click the **Close** button to close the window.

Enabling or Disabling a Port

To enable or disable a port:

1. Double-click the port that you want to configure. A window opens that identifies the type of the port and the port number (in slot#/port# format).
2. In the **Enable/Disable Port** field of the window, click the **up** (enable) or **down** (disable) radio button, then click the **Apply** button.
3. Click the **Close** button to close the **Port Properties** window.



NOTE: As a shortcut, right-click the port and select **Enable** or **Disable**.

Configuring Auto-Negotiation on a Port

To enable or disable auto-negotiation on a port:

1. Double-click the port that you want to configure. A window opens that identifies the type of the port and the port number (in slot#/port# format).
2. In the **Auto Negotiation Supported** field of the window, check (enable) or uncheck (disable) the **Enable Auto-Negotiation** checkbox, then click the **Apply** button.
3. Click the **Close** button to close the window.

Configuring Port Speed

To configure the speed of a port:

1. Double-click the port that you want to configure. A window opens that identifies the type of the port and the port number (in slot#/port# format).
2. In the **Auto Negotiation** field, uncheck the **Enable** checkbox (if necessary).
3. In the **Set Port Speed** field of the window, click a radio button to select a speed, then click the **Apply** button.
4. Click the **Close** button to close the window.

Rebooting the Switch

To reboot the chassis:

1. Right-click the switch in the chassis display (avoid selectable elements such as ports and cards) and click **Reboot**. A window opens and prompts you to save configuration changes.
2. Click **Yes** to save configuration changes or **No** to discard the changes. A window opens to verify that you want to reboot.
3. Click **OK** to reboot, otherwise click **Cancel**.

File Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 13](#)
- [“Opening a Switch with Element Manager” on page 13](#)
- [“Configuring Polling Interval” on page 14](#)
- [“Configuring SNMP Preferences” on page 14](#)
- [“Configuring Miscellaneous Trap Preferences” on page 15](#)
- [“Refreshing the Element Manager Display” on page 15](#)
- [“Launching a Telnet Session” on page 16](#)
- [“Closing Element Manager” on page 16](#)

Introduction

The **File** menu in the EM GUI provides basic GUI functions and configuration options. Some feature buttons provide the same functions. Where the menu and the buttons overlap, the tasks in this chapter describe both options.

Opening a Switch with Element Manager

After you launch EM, you can change the switch that you view and configure with the GUI. To configure a switch other than the one that you opened when you launched EM:

1. Click the **File** menu and select **Open**. The **Open Device** window opens.
2. Enter the IP address or DNS name (if applicable) of the switch that you want to open in the **Device Name or IP Address** field.
3. Enter the SNMP community to which the switch belongs in the **SNMP Community** field.

4. Click the Open button. The switch loads in the EM GUI.

Using the Open Button

To open a switch with the Open button:

1. Click the Open button (📁). The **Open Device** window opens.
2. Enter the IP address or DNS name (if applicable) of the switch that you want to open in the **Device Name or IP Address** field.
3. Enter the SNMP community to which the switch belongs in the **SNMP Community** field.
4. Click the **Open** button. The switch loads in the EM GUI.

Configuring Polling Interval

To configure the frequency with which EM polls the switch for updates:

1. Click the **File** menu and select **Preferences**. The **Preferences** window opens.
2. Click the **Polling** tab.
3. Enter an integer value in the **Status Interval** field to configure the interval, in seconds, at which EM polls the switch.
4. Enter an integer value in the **Hotswap Detect every** field to configure the number of status intervals that pass before EM detects removed or replaced hot-swappable hardware components.
5. Check the **Enable** checkbox, then click the **OK** button.

Disabling Polling

When you disable polling, the EM only refreshes when you manually refresh the display (refer to [“Refreshing the Element Manager Display” on page 15](#)). To disable polling:

1. Click the **File** menu and select **Preferences**. The **Preferences** window opens.
2. Click the **Polling** tab.
3. Uncheck the **Enable** checkbox, then click the **OK** button.

Configuring SNMP Preferences

The SNMP preferences that you can configure depend on the application that controls port 162 on the host that runs EM. switches send all SNMP traps to port 162. If you run an application other than EM that manages port 162, you must manually register your host in each switch that you open with EM to send switch traps to your application. To manually register your host, refer to [“Configuring Your Host as a Trap Receiver” on page 45](#).

If EM controls port 162 to receive SNMP traps from the switch, you can configure host registration and other options. To configure SNMP preferences:

1. Click the **File** menu and select **Preferences**. The **Preferences** window opens.
2. Click the **SNMP** tab.
3. Enter an integer value (from 0 to 5) in the **Retry Count** field to specify the maximum number of retries.
4. Enter an integer value (from 3 to 30) in the **Timeout** field to configure the SNMP timeout interval, in seconds.
5. (Optional) Check the **Trace** checkbox to begin tracing SNMP traps.



NOTE: You can view the SNMP traps as you trace them with the Trace Log (refer to [“Viewing Element Manager Trace Log”](#) on page 15).

6. (Optional) Check the **Register for Traps** checkbox to configure EM to automatically add your host to the Trap Receivers table on any switch that you open in the EM GUI. If another application on your host receives SNMP traps, refer to [“Configuring Your Host as a Trap Receiver”](#) on page 45 to send switch traps to that application.



NOTE: When you check the **Register for Traps** checkbox, EM automatically checks the **Listen for Traps** checkbox.

7. (Optional) Check the **Listen for Traps** checkbox to receive SNMP traps from the switch.



NOTE: If EM does not let you access this checkbox, uncheck the **Register for Traps** checkbox.

8. Click the **OK** button.

Configuring Miscellaneous Trap Preferences

To configure miscellaneous trap preferences:

1. Click the **File** menu and select **Preferences**.
2. Click the **Misc** tab.
3. Enter an integer value in the **Max Traps in Log** field to limit the number of traps that appear in the log.
4. (Optional) Check the **Confirm row deletion** checkbox to confirm row deletion.
5. (Optional) Check the **Save communities in configuration files** checkbox to save SNMP communities in the configuration file.
6. Click the **OK** button.

Viewing Element Manager Trace Log

To view the EM trace log:

1. Click the **File** menu and select **Preferences**.
2. Click the **SNMP** tab.
3. Check the **Trace** checkbox to begin tracing SNMP traps.
4. Click the **Misc** tab.
5. Check the **Show Element Manager Trace Log** checkbox.
6. Click the **OK** button. The **Trace Log** window opens.

Refreshing the Element Manager Display


To refresh the EM display to reflect the most recent status of the switch, perform one of the following steps:

- Click the **File** menu and select **Refresh**.

- Click the Refresh button ()

Launching a Telnet Session

To refresh the EM display to reflect the most recent status of the switch, perform one of the following steps:

- Click the **File** menu and select **Telnet**.
- Click the Telnet button ()

Closing Element Manager

To close EM, click the **File** menu and select **Exit**.

Edit Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 17](#)
- [“Viewing Properties of One Port” on page 17](#)
- [“Viewing Properties of All Ports of the Same Type” on page 19](#)
- [“Configuring Port Properties” on page 20](#)

Introduction

Use the **Edit** menu to select all ports of the same type and view the properties of those ports. Perform **Edit** menu tasks with the EM chassis display. To view and configure the switch from the chassis display, refer to [“Chassis Display Tasks” on page 7](#).

Viewing Properties of One Port

To view the properties of one port:

1. Click the port whose properties you want to view.
2. Click the **Edit** menu and click **Port Properties**. A window opens and displays the properties of the port.

[Table 4-1](#) lists and describes the fields in the **Properties** window of an Ethernet port.

Table 4-1: Ethernet Port Properties Window Fields

Field	Description
Port Type	Displays the port number in slot#/port# format.
Port Name	Provides a port name that you can edit and apply to the port.

Table 4-1: Ethernet Port Properties Window Fields

Field	Description
Enable/Disable Port	Provides the up and down radio buttons so you can configure the administrative status of the port.
Current Port Status	Indicates whether or not the port is ready for use.
Auto Negotiation Supported	Displays true if the port supports auto-negotiation.
Enable Auto Negotiation (checkbox)	Enables or disables auto-negotiation on the port.
Set Port Speed	Provides radio buttons to let you configure the speed of the port.
Current Port Speed	Displays the speed of the port.
Set Duplex	Provides radio buttons to let you configure the duplex setting of the port.
Current Duplex	Indicates whether the port runs in full duplex mode or half duplex mode.
Enable Link Up/Down Trap	Provides enabled and disabled radio buttons to configure whether or not the port sends a trap when links go up or down.
MTU	Displays the maximum transmission unit (MTU) of the port, in bytes.
MAC Address	Displays the media access control (MAC) address of the port.
Last Changed On	Displays the time and date of the last time that a user configured the port.
Action	Lets you flush the ARP table when you click the Apply button.
Result	Displays the result of the action that you perform from the Action field.

[Table 4-2](#) lists and describes the fields in the **Properties** window of an FC port.

Table 4-2: Fibre Channel Port Properties Window Fields

Field	Description
Port Type	Displays the port number in slot#/port# format.
Port Name	Provides a port name that you can edit and apply to the port.
Enable/Disable Port	Provides the up and down radio buttons so you can configure the administrative status of the port.
Current Port Status	Indicates whether or not the port is ready for use.
Auto Negotiation Supported	Displays true if the port supports auto-negotiation.
Enable Auto Negotiation (checkbox)	Enables or disables auto-negotiation on the port.
Set Port Speed	Provides radio buttons to let you configure the speed of the port.
Current Port Speed	Displays the speed of the port.

Table 4-2: Fibre Channel Port Properties Window Fields

Field	Description
Enable Link Up/Down Trap	Provides enabled and disabled radio buttons to configure whether or not the port sends a trap when links go up or down.
MTU	Displays the MTU of the port, in bytes.
WWNN	Worldwide node name of the HCA of the port.
WWPN	Worldwide port name of the port.
Last Changed On	Displays the time and date of the last time that a user configured the port.
Action	Lets you flush the ARP table when you click the Apply button.
Result	Displays the result of the action that you perform from the Action field.

[Table 4-3](#) lists and describes the fields in the **Properties** window of an InfiniBand port.

Table 4-3: InfiniBand Port Properties Window Fields

Field	Description
Port Type	Displays the port number in slot#/port# notation.
Port Name	Provides a port name that you can edit and apply to the port.
Enable/Disable Port	Provides the up and down radio buttons so you can configure the administrative status of the port.
Current Port Status	Indicates whether or not the port is ready for use.
Auto Negotiation Supported	Displays true if the port supports auto-negotiation.
Enable Auto Negotiation (checkbox)	Enables or disables auto-negotiation on the port.
Set Port Speed	Provides radio buttons to let you configure the speed of the port.
Current Port Speed	Displays the speed of the port.
Enable Link Up/Down Trap	Provides enabled and disabled radio buttons to configure whether or not the port sends a trap when links go up or down.
MTU	Displays the MTU of the port, in bytes.
Last Changed On	Displays the time and date of the last time that a user configured the port.

Viewing Properties of All Ports of the Same Type

To view the properties of all ports of the same type:

1. Click **Edit > Select All**, then select the type of port that you want to select. Yellow selection boundaries appear around all ports of that type.
2. Click the **Edit** menu and click **Port Properties**. A window opens and displays a table of all of the properties of the selected ports.

Configuring Port Properties

You can use the **Edit** menu to configure port properties, or you can use the chassis display directly. To configure port properties from the chassis display, refer to [“Chassis Display Tasks” on page 7](#).

Configuring Port Name

You can rename ports from a one-port display or a multiple-port display.

One Port

To configure the name of one port:

1. Click the port whose name you want to change.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays port details.
3. Edit the name in the **Port Name** field, click the **Apply** button, then click the **Close** button.

Multiple Ports

To configure the names of multiple ports:

1. Click **Edit > Select All**, then click the type of the ports whose names you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays a tabular layout of the properties of the ports.
3. Double-click the text in the **Port Name** column of a port that you want to rename, then edit the name. Repeat this step for all ports that you want to rename.
4. Click the **Apply** button, then click the **Close** button.

Enabling or Disabling a Port

You can enable or disable ports from a one-port display or a multiple-port display.

One Port

To enable or disable one port:

1. Click the port that you want to enable or disable.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays port details.
3. In the **Enable/Disable Port** field, click the **up** radio button or **down** radio button.
4. Click the **Apply** button, then click the **Close** button.

Multiple Ports

To enable or disable multiple ports:

1. Click **Edit > Select All**, then click the type of the ports whose names you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays a tabular layout of the properties of the ports.
3. Click the cell in the **Enable/Disable Port** column of a port that you want to enable or disable, then select **up** or **down** from the pulldown menu that appears.
4. Click the **Apply** button, then click the **Close** button.

Enabling or Disabling Auto-Negotiation

You can enable or disable auto-negotiation on ports from a one-port display or a multiple-port display.

One Port

To enable or disable auto-negotiation on one port:

1. Click the port that you want to enable or disable.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays port details.
3. Check or uncheck the **Enable Auto-Negotiation** checkbox.
4. Click the **Apply** button, then click the **Close** button.

Multiple Ports

To enable or disable auto-negotiation on multiple ports:

1. Click **Edit > Select All**, then click the type of the ports whose names you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays a tabular layout of the properties of the ports.
3. Click the cell in the **Enable Auto-Negotiation** column of a port that you want to configure, then select **true** or **false** from the pulldown menu that appears.
4. Click the **Apply** button, then click the **Close** button.

Configuring Port Speed

You can configure port speed from a one-port display or a multiple-port display.



NOTE: You must disable auto-negotiation on a port before you assign a speed to the port.

One Port

To configure port speed for one port:

1. Click the port that you want to enable or disable.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays port details.
3. Click the radio button, in the **Set Port Speed** field, of the speed that you want to apply.
4. Click the **Apply** button, then click the **Close** button.

Multiple Ports

To configure port speed for multiple ports:

1. Click **Edit > Select All**, then click the type of the ports whose names you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays a tabular layout of the properties of the ports.
3. Click the cell in the **Set Port Speed** column of a port that you want to configure, then select the speed that you want to apply from the pulldown menu that appears. Repeat this step for all ports that you want to configure.
4. Click the **Apply** button, then click the **Close** button.

Enabling or Disabling Link Up/Down Traps

You can enable or disable link up and link down traps from a one-port display or a multiple-port display.

One Port

To enable or disable up/down traps for one port:

1. Click the port that you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays port details.
3. Click the **enabled** or **disabled** radio button, in the **Enable Link Up/Down Trap** field.
4. Click the **Apply** button, then click the **Close** button.

Multiple Ports

To enable or disable up/down traps for multiple ports:

1. Click **Edit > Select All**, then click the type of the ports whose names you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays a tabular layout of the properties of the ports.
3. Click the cell in the **Enable Link Up/Down Trap** column of a port that you want to configure, then the select **enabled** or **disabled** from the pulldown menu that appears. Repeat this step for all ports that you want to configure.
4. Click the **Apply** button, then click the **Close** button.

Executing Port Actions

Some port types can execute specific actions. You can execute actions from a one-port display or a multiple-port display.

One Port

To execute actions on one port:

1. Click the port that you want to enable or disable.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays port details.
3. In the **Action** field, click the radio button of the action that you want to execute.
4. Click the **Apply** button, then click the **Close** button.

Multiple Ports

To execute actions on multiple ports:

1. Click **Edit > Select All**, then click the type of the ports whose names you want to configure.
2. Click the **Edit** menu and select **Port Properties**. A window opens and displays a tabular layout of the properties of the ports.
3. Click the cell in the **Action** column of a port on which you want to execute an action, then select the action from the pulldown menu that appears. Repeat this step for every port on which you want to execute an action.
4. Click the **Apply** button, then click the **Close** button.

Maintenance Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 24](#)
- [“Viewing Basic System Information” on page 24](#)
- [“Configuring Basic System Information” on page 24](#)
- [“Configuring Date and Time Properties” on page 25](#)
- [“Configuring Basic Services” on page 25](#)
- [“Viewing RADIUS Servers” on page 27](#)
- [“Enabling HTTP Services” on page 28](#)
- [“Customizing the Boot Configuration” on page 29](#)
- [“Backing Up the Running Configuration File” on page 29](#)
- [“Viewing Files in the File System” on page 30](#)
- [“Installing Software Images” on page 31](#)
- [“Importing Configuration Files and Image Files” on page 33](#)
- [“Exporting Configuration Files and Log Files” on page 34](#)
- [“Saving a Configuration File” on page 35](#)
- [“Rebooting Your Switch” on page 35](#)
- [“Running General Diagnostics” on page 35](#)
- [“Viewing POST Diagnostics” on page 37](#)
- [“Viewing FRU Diagnostics” on page 38](#)

Introduction

The **Maintenance** menu provides opportunities to monitor your switch and configure fundamental behavior.

Viewing Basic System Information

Basic system information includes the name of your device, the location of your device, and support resources. To view basic system information:

1. Click the **Maintenance** menu and select **System Info**. The **System Info** window opens. [Table 5-1](#) lists and describes the fields in the window.

Table 5-1: System Info Window Fields

Field	Description
Description	Description of the chassis and the image that runs on the chassis.
System Uptime	Amount of time the chassis has run since the last boot.
Last Change Made At	Date and time that a user last changed the running configuration.
Last Config Saved At	Date and time that a user last saved the running configuration as the startup configuration.
System Name	Configurable name for your switch.
Location	Configurable location of your switch.
Support Contact	Configurable support information for your switch.

Configuring Basic System Information

Basic system information includes the name of your device, the location of your device, and support resources.

Naming Your InfiniBand Switch

To assign a hostname to your device:

1. Click the **Maintenance** menu and select **System Info**. The **System Info** window opens.
2. In the **System Name** field, enter the name that you want to assign to the device, then click the **Apply** button.

Defining Device Location

To add a physical device location description to your switch:

1. Click the **Maintenance** menu and select **System Info**. The **System Info** window opens.
2. In the **Location** field, enter the location of your device, then click the **Apply** button.

Defining Technical Support Resource

The technical support email address that you define appears in the System frame when you refresh or restart EM. To define a technical support resource:

1. Click the **Maintenance** menu and select **System Info**. The **System Info** window opens.
2. In the **Support Contact** field, enter the email address of your technical support provider, then click the **Apply** button.

Configuring Date and Time Properties

An internal clock runs on your device, but we recommend that you configure your device to access a network time protocol (NTP) server to synchronize your device with your network.

Configuring Date and Time

To configure the date and time of the internal clock on your device:

1. Click the **Maintenance** menu and select **Time**. The **Date and Time Properties** window opens.
2. In the **Date** field, enter the date in the *MM/DD/YY* format.
3. In the **Time** field, enter the time in *HH:MM:SS* format, then click the **Apply** button.
4. Click the **Apply** button in the **Date and Time** partition.

Assign NTP Servers

To configure your device to use an NTP server to synchronize your switch with the network:

1. Click the **Maintenance** menu and select **Time**. The **Date and Time Properties** window opens.
2. In the **NTP Server 1** field, enter the IP address of the NTP server that you want your switch to use.
3. (Optional) In the **NTP Server 2** field, enter the IP address of the NTP server that you want your switch to use in the event that your switch cannot access the primary NTP server.
4. (Optional) In the **NTP Server 3** field, enter the IP address of the NTP server that you want your switch to use in the event that your switch cannot access the primary or secondary NTP servers.
5. Click the **Apply** button in the **NTP Servers** partition.



NOTE: When your device cannot access a NTP server, it defaults to the on-board clock.

Configuring Basic Services

Configure basic services to facilitate remote access to your device.

Assigning a DNS Server

To assign a DNS server to your device:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **DNS** tab.
3. In the **Server 1** field, enter the IP address of the primary DNS server that you want to use.
4. (Optional) In the **Server 2** field, enter the IP address of the DNS server that you want to use if your device cannot access the primary DNS server.

5. In the **Domain** field, enter the domain to which you want your switch to belong, then click the **Apply** button.

Enabling or Disabling the FTP Access

To enable FTP transfers to and from your device:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **FTP** tab.
3. Check (to enable) or uncheck (to disable) the **Enable FTP Server** checkbox, then click the **Apply** button.

Enabling or Disabling the Telnet Access

To enable telnet access to your device:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Telnet** tab.
3. Check (to enable) or uncheck (to disable) the **Enable Telnet Server** checkbox, then click the **Apply** button.

Assigning a SYSLOG Server



NOTE: This task assumes that you have already configured the host and connected it to the IB fabric.

To assign a SYSLOG server to store logs from your device:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Syslog** tab.
3. In the **Remote Syslog Server** field, enter the IP address of the remote server to accept messages from your device, then click the **Apply** button.

Assigning an Authentication Method

To assign an authentication method to your device:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Radius** tab.
3. In the **Authentication Method** field, click a radio button to select a method, then click the **Apply** button. [Table 5-2](#) lists and describes the radio buttons that you can choose.

Table 5-2: CLI Authentication Methods

Button	Description
local	Authenticates user logins with the local CLI user database only.
localThenRadius	Authenticates user logins with the local CLI user database; upon failure, authenticates with the RADIUS server.
radiusThenLocal	Authenticates user logins with the RADIUS server; upon failure, authenticates with the local CLI user database.

Viewing RADIUS Servers

To view the RADIUS servers that you have configured your device to use to authenticate CLI and EM logins:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Radius Servers** tab. [Table 5-3](#) lists and describes the fields in the **Radius Servers** table.

Table 5-3: Radius Server Properties Window Fields

Field	Description
Address	Displays the IP address of the RADIUS server.
UDP Port	UDP authentication port of the RADIUS server. Edit this value and click the Apply button to configure the UDP port of the RADIUS server. The numbers to the right of the field indicate the range of integer values that this field supports.
Encryption Key	Authentication key that the client and RADIUS server use. Enter a value and click the Apply button to configure the encryption key of the RADIUS server. The numbers to the right of the field indicate the range of integer values that this field supports.
Timeout	Amount of time, in seconds, in which the server must authenticate a login before the login fails. Edit this value and click the Apply button to configure the timeout value of the RADIUS server. The numbers to the right of the field indicate the range of integer values that this field supports.
Max Retries	Number of sequential logins that a user may perform before the server denies access to the username altogether. Edit this value and click the Apply button to configure the maximum number of retries that the RADIUS server permits. The numbers to the right of the field indicate the range of integer values that this field supports.
Access Requests	Number of authentication requests that the server has received from your device since your device booted.
Access Accepts	Number of logins to your device that the server authenticated since your device booted.
Access Rejects	Number of logins to your device that the server denied since your device booted.
Server Timeout	Number of authentications that timed out on the server since your device booted.

Adding RADIUS Servers

To configure a new RADIUS server on your device:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Radius Servers** tab.
3. Click the **Insert** button. The **Insert Radius Server** window opens.



NOTE: Click the **Close** button at any time to abort this process with no changes to your device. Configurations apply only after you click the **Apply** button.

4. In the **Address** field, enter the IP address of the server.
5. (Optional) Edit the **UDP Port** field. The numbers to the right of the field indicate the range of integer values that this field supports.
6. (Optional) Enter an encryption key in the **Encryption Key** field.
7. (Optional) Edit the **Timeout** field. The numbers to the right of the field indicate the range of integer values that this field supports.
8. (Optional) Edit the **Max Retries** field. The numbers to the right of the field indicate the range of integer values that this field supports.
9. Click the **Insert** button.

Editing a RADIUS Server Configuration

To remove a RADIUS server from your configuration:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Radius Servers** tab.
3. Identify the row of the RADIUS server that you want to reconfigure, then double-click the cell that you want to edit.



NOTE: You can only edit cells that have a white background.

4. Edit the content of the cell.
5. Click the **Apply** button.

Deleting RADIUS Servers

To remove a RADIUS server from your configuration:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **Radius Servers** tab.
3. Click the row entry of the RADIUS server that you want to delete.
4. Click the **Delete** button.

Enabling HTTP Services

To configure HTTP services:

1. Click the **Maintenance** menu and select **Services**. The **Services** window opens.
2. Click the **HTTP** tab.
3. Check the **Enable HTTP Server** checkbox.
4. (Optional) Assign a port in the **HTTP Port** field.
5. (Optional) Check the **Enable HTTP Polling** checkbox.
6. (Optional) Check the **Enable HTTPS Server** checkbox.
7. (Optional) Assign a port in the **HTTPS Port** field.
8. Select a security method from the **Secure Cert Common Name** field.
9. Click the **Apply** button.

Customizing the Boot Configuration

Customize the boot configuration to:

- View the image that the switch will boot during the next reboot.
- Delete the startup configuration.
- Overwrite the startup configuration with another configuration file in your file system.

Configuring Reboot Image

To choose the image that the switch loads when it reboots:

1. Click the **Maintenance** menu and select **Boot Config**. The **Boot Configuration** window opens.
2. From the **Image Source For Next Reboot** pulldown menu, select the image that you want the switch to load when it reboots.
3. Click the **Apply** button in the **Software Images** partition.

Deleting or Overwriting the Startup Configuration

1. Click the **Maintenance** menu and select **Boot Config**. The **Boot Configuration** window opens.
2. (Optional) Click the **Overwrite startup configuration with** radio button, then select a configuration from the pulldown menu to replace the current startup configuration with another configuration file.



NOTE: To overwrite your startup configuration with your running configuration, refer to [“Backing Up the Running Configuration File”](#) on page 29.

3. (Optional) Click the **Delete startup configuration** radio button to configure your switch to use the factory default startup configuration.
4. Click the **Apply** button in the **Startup Configuration** partition.

Backing Up the Running Configuration File

To save your running configuration file:

1. Click the **Maintenance** menu and select **Backup Config**. The **Backup Configuration** window opens.
2. Enter a file name in the **Save Configuration As** field. EM will save your running configuration in the config directory with the name that you specify.



NOTE: Enter **startup-config** in this field if you want to save the running configuration as the startup configuration. This process overwrites the existing startup configuration file.

3. Click the **Save** button.

Viewing Files in the File System

To view files, such as image files, log files, and configuration files, that reside on your device:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens. Table 5-4 lists and describes the fields in the **Current Files on System** table.

Table 5-4: Current Files on System Table Fields

Field	Description
Slot ID	Slot of the controller card on which the file resides.
File Name	Name of the file.
File Type	Type of file. The following types may appear: <ul style="list-style-type: none"> • config • log • image
Size	Size of the file, in bytes.
Date	Most recent date and time that your device or a user updated the file.

2. (Optional) Click the **Refresh** button to poll your switch and update your display to reflect the most current inventory of your file system.

Deleting Files in the File System

To delete files from your file system:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens.
2. Click the line in the **Current Files on System** table that lists the file that you want to delete, then click the **Delete** button. A **Delete File** window opens.
3. Click the **Yes** button.

Understand Configuration Files

A configuration file is a text file that stores a list of CLI commands.

About the Startup-Config

The main configuration file is called startup-config. This file stores all of the CLI commands necessary to completely configure a box from a factory default state. This configuration file can be copied, backed up, and modified.

About the Running-Config

Whenever configuration changes are made via the GUI or CLI, a CLI command is temporarily saved in a virtual configuration file called running-config. If the administrator wishes to save these changes permanently, this file is “copied” into the startup-config file.

Any number of configuration files can be stored. For convenience and rapid configuration, files can also maintain a partial list of CLI commands. These can also be copied into running-config for immediate use or startup-config for persistent use across reboots.

Understanding Log Files

Log files are text files that record activity, including configuration changes. Depending on size, log files are rotated and compressed. Log files can also be exported from the switch by using the copy command.

File Management and Storage

The management of log files is performed automatically, but can be configured. Log files are stored separately from other file types, but all files share the 128 MB of flash memory. Log files are stored in syslog files.

The system checks the size of the active log file hourly, and when it exceeds 1 MByte, the active log file, `ts_log`, is closed, compressed, and renamed `ts_log.1.gz`. Other `ts_log.x.gz` files are incremented by 1. These files can be downloaded via the Log Viewer GUI, which can create filters for troubleshooting and auditing purposes.

About Message Types

The following levels of logging are captured:

- CONF - configuration changes. No user action is required.
- INFO - general information. No user action is required.
- WARN - abnormal condition. User intervention may be required.
- ERROR - abnormal condition. User intervention is required.
- FATAL - abnormal condition. User must reboot.

Installing Software Images

To skip directly to the instructions, refer to [“Installing a Software Image” on page 33](#). The sections that follow provide context and details about installing images.

About the System Image

The Image data that is used to configure the software is being continuously updated and enhanced. Use the latest system image data to ensure the most efficient usage of your system.

Refer to the user’s support portal at support.hp.com for the latest upgrades.

What is a System Image?

A system image is an unpacked and installed image file. An image file is the source from which to install a system image and it has an `.img` extension.

When an image file is installed, the image file is expanded into a “system image.” The system image is what the user will refer to in order to specify what the system should use to boot up each card in the system.

What is an Image File?

Image files are stored in flash memory as a single complete file with a switch `.img` extension. Each image file contains all the operating software (application software and firmware/microcode) needed by the various cards that can be installed into the switch.

The switch cannot use an image file directly to boot up the system. The image file must first be installed. The installation process automatically unbundles the image file and distributes the software components to each card in the switch. Users do not have to be aware of individual software components. The user simply executes one CLI command to install an image file. Refer to the **install** command in the *HP 24-Port 4x Fabric Copper Switch Command Line Interface Reference Guide*.

The TopspinOS stores up to three images on a disk: the uninstalled image, the current system (or installed) image, and the recovery image.

The switch only has enough flash memory to store:

- one system image file (active)
- one image file (inactive/uninstalled)
- one recovery image

Occasionally, you will have to manually delete an image file from the IB system to make room for a new version. Refer to [“Deleting Files in the File System” on page 30](#).

Inactive Image

An inactive image is one that has been downloaded, but has not been installed; therefore it is not the active, or system image.

The TopspinOS can only store one inactive image. Delete inactive images through the CLI (refer to [“Deleting Files in the File System” on page 30](#)), or by clicking the **delete** button in EM.

Active Image

The term “active image” refers to the current system image. An installed, or active image has gone through the entire upgrade process. The system image usually has a slash (/) in its name. Do not modify or delete the installed system image.

Recovery Image

The recovery image is a default image that comes installed on the switch. The recovery image can be used to quickly restore operation to the system if an image upgrade should fail.

About the Version Numbers

The OS and installed system image running on the IB system determine the supported software features.

Two types of system images are provided:

- One for the HCA card
- One for the Topspin 90, 120, 270, or 360

Before configuring the IB system, check the version of the installed system image used to boot the chassis. Use this information to ensure that you upgrade to the correct software.

About Copying/Downloading the Image

Upgrading the TopspinOS requires several steps, which are described in the following sections. One of the steps will be to copy the image before installing it. [Table 5-5](#) identifies options when copying the image into the system.

Table 5-5: Copying/Downloading Image Options

Through the CLI	Through the GUI
FTP	Remote FTP Server
TFTP	Local File

Card Status Requirements

Only cards with an oper-status of “up” are updated. If a card is down when you run install, or a card is added after running install:

1. Bring up the card.
2. Run install again.
3. Specify the same image file. If the image is already installed on a card, that card is skipped.
4. Be sure to specify the boot-config again so that all cards know to boot from the same system image.

Upgrade Procedure Overview

The system upgrade process is summarized in the following steps:

1. Set up the hardware connection for the upgrade.
2. Verify the installed system-image version number.
3. Do one of the following:
 - Download an image file from a network-accessible ftp server.
 - Download an image file remotely from a tftp server.
4. Install the new system-image.
5. Configure the CLI and EM to use the appropriate configuration file the next time they reboot.
6. Reboot the system.

Installing a Software Image

To install an image file:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens.



NOTE: If you have not already imported an image file to your file system, refer to [“Importing Configuration Files and Image Files” on page 33](#).

2. Click the line in the **Current Files on System** table that lists the file that you want to install, then click the **Install** button. A verification window opens.



NOTE: Before you install an image, verify that you have brought up all of the cards on the chassis that you want to run the new image. Cards that run a different image from the chassis cannot pass traffic.



NOTE: Alert other users that you plan to install a new image on your switch.

3. Click the **Yes** button to install the image.

Importing Configuration Files and Image Files

You can import files to your switch from your local host or a remote FTP server.

Importing from a Remote Server

To import files to your switch from remote devices:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens.
2. Click the **Import** button. The **Import File** window opens.
3. From the **File Type** pulldown menu, select the type of file that you want to import (image or configuration).
4. Click the **Remote FTP Server** radio button.
5. Enter the DNS name or IP address of the FTP server that holds the file that you want to import in the **Server Name or IP Address** field.
6. Enter the user ID that logs you in to the FTP server in the **User Name** field.
7. Enter the password that logs you in to the FTP server in the **Password** field.
8. Enter the directory path and name of the file on the FTP server in the **File Path and Name** field.
9. Enter the name that the file will take on your switch in the **File Name on System** field.
10. Click the **Copy** button.

Importing from Your Local Host

To import files to your switch from your local host:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens.
2. Click the **Import** button. The **Import File** window opens.
3. Select, from the **File Type** pulldown menu, the type of file that you want to import (image or configuration).
4. Click the **Local File** radio button.
5. Click the **Choose** button and navigate to the file that you want to import.
6. Click the file that you want to import, then click the **OK** button.
7. Enter the name that the file will take on your switch in the **File Name on System** field.
8. Click the **Copy** button.

Exporting Configuration Files and Log Files

You can export files from your switch to your local host or a remote FTP server.

Exporting to a Remote Server

To export files from your switch to a remote device:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens.
2. Click the **Export** button. The **Export File** window opens.
3. Click the **Remote FTP Server** radio button.
4. Enter, in the **Server Name or IP Address** field, the DNS name or IP address of the FTP server that will receive the file that you want to export.
5. Enter, in the **User Name** field, the user ID that logs you in to the FTP server.
6. Enter, in the **Password** field, the password that logs you in to the FTP server.

7. Enter, in the **File Path and Name** field, the path on your remote host where you want to copy the exported file, as well as the name that you want to assign for the file.

Example

/root/files/old-config.cfg

8. Click the **Copy** button.

Exporting to Your Local Host

To export files from your switch to your local host:

1. Click the **Maintenance** menu and select **File Management**. The **File Management** window opens.
2. Click the **Export** button. The **Export File** window opens.
3. Click the **Local File** radio button.
4. Click the **Choose** button.
5. Navigate to the directory where you want to copy the file, then click the **OK** button.
6. Click the **Copy** button.

Saving a Configuration File

To back up your running configuration to the standby controller on your chassis:

1. Click the **Maintenance** menu and select **Save Config**.



NOTE: If you make configuration changes to the master SM and then save the configuration, verify that the master and backup have synchronized, then save the configuration on the backup as well. For more information, refer to [“Configuring Database Synchronization” on page 71](#).

Rebooting Your Switch

To reboot your switch with EM:

1. Click the **Maintenance** menu and select **Reboot**.
2. Click the **OK** button.

Running General Diagnostics

With EM, you can run the following diagnostics:

- chassis
- card
- port

Running Chassis Diagnostics

To run chassis diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > General**.
2. Click the **Chassis** tab.

3. Click, in the **Module Type** field, the radio button of the type of element that you want to diagnose.
4. Enter the index number of the element that you want to diagnose in the **Module Number** field.
5. Click, in the **Test** field, the radio button of the type of test that you want to run.
6. Enter the number of times that you want the test to run in the **Iterations** field.
7. Click, in the **Action** field, the start radio button to begin a test or the stop radio button to end a test.
8. Click, in the **Option** field, the error condition that you want to apply.
9. Click the **Apply** button to execute the configuration and start or stop the test.

Configuring Card Diagnostics

To run card diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > General**.
2. Click the **Card** tab.
3. Click the **Insert** button. The **Diagnostic, Insert Card** window opens.
4. Click the **Card** pulldown menu and select the card that you want to test.
5. Click, in the **Test** field, the type of test that you want to execute.
6. Enter, in the **Iterations** field, the number of test iterations that you want to run.
7. Select an action from the **Action** field:
 - Click the **start** radio button if you want the test to execute when you click the **Insert** button ([Step 8](#)).
 - Click the **stop** radio button if you want the test to appear in the table but not execute. To execute the test later, refer to [“Running Configured Diagnostic Tests” on page 37](#).
8. Click the **Insert** button.

Deleting a Card Test Entry

To delete a card test entry:

1. Click the **Maintenance** menu, then select **Diagnostics > General**.
2. Click the **Card** tab.
3. Click the row of the entry that you want to delete, then click the **Delete** button.

Configuring Port Diagnostics

To run port diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > General**.
2. Click the **Port** tab.
3. Click the **Insert** button. The **Diagnostic, Insert Port** window opens.
4. Enter a port (or ports) in the **Port** field, or click the “...” button, select ports, and click the **OK** button.
5. Click, in the **Test** field, the radio button of the test that you want to execute.
6. (Optional) Check the **Data Validation** checkbox to validate data.
7. Enter the size, in bits, of the data packet that you want to send in the **Data Size** field.
8. Enter the data pattern that you want to iterate in the test in the **Data Pattern** field.
9. Enter the number of iterations that you want to execute in the **Iterations** field.
10. Enter a source LID in the **Source ID** field.
11. Enter a destination LID in the **Target ID** field.

12. Select an action from the **Action** field:
 - Click the **start** radio button if you want the test to execute when you click the Insert button (Step 8.).
 - Click the **stop** radio button if you want the test to appear in the table but not execute. To execute the test later, refer to [“Running Configured Diagnostic Tests” on page 37](#).
13. Click the **Insert** button.

Deleting a Port Test Entry

To delete a card test entry:

1. Click the **Maintenance** menu, then select **Diagnostics > General**.
2. Click the **Port** tab.
3. Click the row of the entry that you want to delete, then click the **Delete** button.

Running Configured Diagnostic Tests

To run a diagnostic test that you have already added to the **Diagnostics** window:

1. Click the **Maintenance** menu, then select **Diagnostics > General**.
2. Click the appropriate tab for the test that you want to run.
3. Identify the entry of the test that you want to run.
4. Click the cell in the **Action** column of that entry and select **start** from the pulldown menu.



NOTE: The cell must display **stop** for this process to work. If the cell displays **start**, select **stop** from the pulldown menu and click the **Apply** button, then perform this step.

5. Click the **Apply** button, then repeatedly click the **Refresh** button to track the progress of the test.

Viewing POST Diagnostics

You can view POST diagnostics for the following elements:

- cards
- power supplies
- fans

Card

To view card POST diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > POST**.
2. Click the **Card** tab. [Table 5-6](#) lists and describes the fields on this tab.

Table 5-6: Card POST Fields

Field	Description
Slot ID	Slot number.

Table 5-6: Card POST Fields

Field	Description
POST Status	Indicates the result of POST (Power-on-self-test): <ul style="list-style-type: none"> unknown passed failed
PostErrorCodes	Show error(s) detected during POST.

Power Supply

To view power supply POST diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > POST**.
2. Click the **Power Supply** tab. [Table 5-7](#) lists and describes the fields on this tab.

Table 5-7: Power Supply POST Fields

Field	Description
PS ID	Power supply number.
POST Status	Indicates the result of POST (Power-on-self-test): <ul style="list-style-type: none"> unknown passed failed
PostErrorCodes	Show error(s) detected during POST.

Fan

To view fan POST diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > POST**.
2. Click the **Fan** tab. [Table 5-8](#) lists and describes the fields that appear.

Table 5-8: Fan POST Fields

Field	Description
Fan ID	Fan number.
POST Status	Indicates the result of POST (Power-on-self-test): <ul style="list-style-type: none"> unknown passed failed
PostErrorCodes	Show error(s) detected during POST.

Viewing FRU Diagnostics

You can view FRU diagnostics for the following elements:

- cards
- power supplies
- fans

Card

To view card FRU diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > POST**.
2. Click the **Card** tab. [Table 5-9](#) lists and describes the fields on this tab.

Table 5-9: Card POST Fields

Field	Description
Slot ID	Slot number.
FruError	Shows the last hardware error (if any) detected on this FRU. The information returned in this variable is read from the device's VPD.

Power Supply

To view power supply FRU diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > POST**.
2. Click the **Power Supply** tab. [Table 5-10](#) lists and describes the fields on this tab.

Table 5-10: Power Supply POST Fields

Field	Description
PS ID	Power supply number.
FruError	Shows the last hardware error (if any) detected on this FRU. The information returned in this variable is read from the device's VPD.

Fan

To view fan FRU diagnostics:

1. Click the **Maintenance** menu, then select **Diagnostics > POST**.
2. Click the **Fan** tab. [Table 5-11](#) lists and describes the fields this tab.

Table 5-11: Fan POST Fields

Field	Description
Fan ID	Fan number.
FruError	Shows the last hardware error (if any) detected on this FRU. The information returned in this variable is read from the device's VPD.

Health Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 41](#)
- [“Viewing Health Summary” on page 41](#)
- [“Viewing Power Supply Status” on page 42](#)
- [“Viewing Fan Status” on page 42](#)
- [“Viewing Sensor Status” on page 43](#)
- [“Configuring Your Host as a Trap Receiver” on page 45](#)
- [“Viewing Logs” on page 46](#)

Introduction

The **Health** menu provides options that let you verify the status of your Server Switch. With **Health** menu options, you can view the operational status of Server Switch and view logs of Server Switch events.

Viewing Health Summary

To view a summary of the health of your Server Switch:

1. Click the **Health** menu and select **Status**. The **Health Status** window opens.
2. Click the **Summary** tab. [Table 6-1](#) lists and describes the fields on this tab.

Table 6-1: Summary Tab Fields

Field	Description
Up Time	Displays amount uptime of the switch since the last reboot.

Table 6-1: Summary Tab Fields

Field	Description
Power	Displays a green check if all power supplies function successfully. Displays a red X if a power supply experiences a problem.
Fans	Displays a green check if all fans function successfully. Displays a red X if a fan experiences a problem.
Sensors	Displays a green check if all temperature sensors function successfully. Displays a red X if a temperature sensor experiences a problem or if the temperature exceeds the safe threshold.

Viewing Power Supply Status

To view the status of the power supplies on your Server Switch:

1. Click the **Health** menu and select **Status**. The **Health Status** window opens.
2. Click the **Power Supplies** tab. [Table 6-2](#) lists and describes the fields on this tab.

Table 6-2: Power Supplies Tab Fields

Field	Description
PS ID	Numeric identifier of the power supply. For more information on the power supplies in your device, refer to your hardware documentation.
Type	Type of power (AC or DC).
Oper Status	Displays up to indicate that your power supply functions and currently supplies power to your device. Displays down for faulty power supplies.
Utilization	Percentage of total power supply resources in use.
Voltage	Voltage of the power supply.
Product Serial Number	Factory-assigned product serial number.
PCA Serial Number	Printed circuit assembly (PCA) serial number.
PCA Assembly Number	Printed circuit assembly (PCA) assembly number.
FRU Number	Field replaceable unit (FRU) number.

Viewing Fan Status

To view the status of the fans on your Server Switch:

1. Click the **Health** menu and select **Status**. The **Health Status** window opens.
2. Click the **Fans** tab. [Table 6-3](#) lists and describes the fields on this tab.

Table 6-3: Fans Tab Fields

Field	Description
FanId	Numeric identifier of the fan. For more information on the fans in your device, refer to your hardware documentation.
OperStatus	Displays up if the fan functions properly; otherwise, displays down .
Speed	Displays the speed of the fan in percentage of maximum speed.
ProductSerialNum	Factory-assigned product serial number.

Table 6-3: Fans Tab Fields

Field	Description
PcaSerialNum	Printed circuit assembly (PCA) serial number.
PcaAssemblyNum	Printed circuit assembly (PCA) assembly number.
FruNum	Field-replaceable unit (FRU) number.

Viewing Sensor Status

To view the status of the temperature sensors on your Server Switch:

1. Click the **Health** menu and select **Status**. The **Health Status** window opens.
2. Click the **Sensors** tab. [Table 6-4](#) lists and describes the fields on this tab.

Table 6-4: Fans Tab Fields

Field	Description
Slot ID	Numeric identifier of the slot in which the temperature sensor resides. For more information on the slots in your device, refer to your hardware documentation.
Sensor ID	Numeric identifier of the temperature sensor.
Oper Status	Operational code of the sensor. This field displays normal , tempAlert , currAlert , or voltAlert .
Oper Code	Temperature of the slot.
Current Temp	Current temperature of the chassis.
Alarm Temp	Chassis temperature that triggers an alarm.
Shutdown Temp	Chassis temperature that triggers a shutdown.

Viewing Server Switch Events

When you configure your local host to receive Server Switch events, you can then view a log of the events. Before you view Server Switch events, refer to [“Configuring Your Host as a Trap Receiver” on page 45](#).

To view Server Switch events on a host that you have configured to receive events, click the **Health** menu and select **Event Viewer**. The **Event Viewer** window opens. [Table 6-5](#) lists and describes the fields in the window.

- (Optional) Click the **Node** column header to organize the **Event Viewer** table by node. Click the header a second time to reverse the order (from top to bottom) of the display.
- (Optional) Click the **Time** column header to organize the **Event Viewer** table by node. Click the header a second time to reverse the order (from top to bottom) of the display.
- (Optional) Click the **Type** column header to organize the **Event Viewer** table by node. Click the header a second time to reverse the order (from top to bottom) of the display.
- (Optional) Click the **Description** column header to organize the **Event Viewer** table by node. Click the header a second time to reverse the order (from top to bottom) of the display.

Table 6-5: Event Viewer Fields

Field	Description
Node	IP address of the Server Switch on which the event took place.

Table 6-5: Event Viewer Fields

Field	Description
Time	Time that the event took place.
Type	Type of event that took place.
Description	Description of the event.

Exporting Event Logs to a Text File

To export an event log:

1. Click the **Health** menu and select **Event Viewer**. The **Event Viewer** window opens.
2. Click the **Export** button. The **Save** window opens.
3. Navigate to the folder on your local host on which you want to store the event log.
4. Enter a file name for the log in the **File Name** field, then click the **Save** button. EM creates a text file with the contents of the event log on your host.

Clearing Event Entries by Category

To clear select event types from the **Event Viewer** table:

1. Click the **Health** menu and select **Event Viewer**. The **Event Viewer** window opens.
2. Click the **Clear** button, then click the type of entry that you want to remove from the table. All entries of that type disappear from the display.

Clearing All Event Entries

To clear all events from the **Event Viewer** table:

1. Click the **Health** menu and select **Event Viewer**. The **Event Viewer** window opens.
2. Click the **Clear** button, then click **All**. All event entries disappear from the display.

Configuring Trap Receivers

You must configure your host to receive traps in order to view events. If no other application on your local host controls port 162, EM automatically registers your local host as a trap receiver. To verify that EM registered your host:

1. Click the **Health** menu, then click **Trap Receivers**. The **Trap Receivers** window opens.
2. Verify that the IP address of your host appears in the **Address** column. If it appears, verify that **true** appears in the **Receive Events** column.



NOTE: If your local host has multiple IP addresses (for example, one from a LAN and one from a wireless connection, disable all IP addresses other than the LAN address, then close EM and open it again. Verify that only the LAN address appears in the **Trap Receivers** window. If it appears, you can enable your other addresses.

Configuring Your Host as a Trap Receiver

If you have an application (other than EM) that takes over port 162 to receive and manage SNMP traps, you must add your host to the Server Switch configuration with EM. This allows the application to receive Server Switch traps. To add your host as a trap receiver:

1. Click the **Health** menu and select **Trap Receivers**. The **Trap Receivers** window opens.
2. Click the **Insert** button. The **Insert Trap Receivers** window opens.
3. Enter the IP address of your host in the **Address** field.
4. Enter the SNMP community of your host in the **Community** field.
5. Check the **Receive Events** checkbox, then click the **Insert** button.

Deleting Your Host as a Trap Receiver

If you manually configured your host as a trap receiver, you must manually remove your host to de-register. To delete your host as a trap receiver:

1. Click the **Health** menu and select **Trap Receivers**. The **Trap Receivers** window opens.
2. Click your host in the **Trap Receivers** table, then click the **Delete** button.
3. Click the **Close** button.

Viewing Authentication Failures

To view authentication failures:

1. Click the **Health** menu and select **Authentication**. The **Authentication** window opens. [Table 6-6](#) lists and displays the fields in this window.

Table 6-6: Authentication Fields

Field	Description
Enable Authentication Traps	Provides radio buttons to enable and disable authentication traps.
CLI Access Violation Count	Number of CLI access violation counts.
CLI Last Violation Time	Time of the most recent CLI access violations.
SNMP Access Violation Count	Number of SNMP access violation counts.
SNMP Last Violation Time	Time of the most recent SNMP access violations.
HTTP Access Violation Count	Number of HTTP access violation counts.
HTTP Last Violation Time	Time of the most recent HTTP access violations.

Enabling Failure Traps

To enable authentication traps:

1. Click the **Health** menu and select **Authentication**. The **Authentication** window opens.
2. Click the **enabled** radio button, then click the **Apply** button.

Viewing Logs

To view one of the logs in the file system on your Server Switch:

1. Click the **Health** menu, then click **Log Viewer**. The **Log Viewer** window opens.
2. Click the **Download** button. The **Download Log Files** window opens.
3. Click, in the **Available log files** table, the log that you want to view, then click the **Download** button. The **Save As** window opens.
4. Navigate to the directory in which you want to save the log file, then click the **Save** button. A **Download Complete** window opens and displays an **Open File** checkbox.
5. Check the **Open File** checkbox, then click the **OK** button. The log opens in the **Log Viewer** window.

Applying Filters to ts_log Displays

When you configure and apply filters, EM removes from the display all entries that do not match the filter criteria. To remove particular entries from log displays:

1. Click the **Health** menu, then click **Log Viewer**. The **Log Viewer** window opens.
2. Open a ts_log file. For detailed instructions, refer to [“Viewing Logs” on page 46](#).
3. Click the **Filter** button. The **Log Filter** window opens.
4. Select the filter attributes that you want to apply. Note the following:
 - All filter options are cumulative. If you choose **slot 1** and **WARN**, the log viewer only displays logs that apply to slot 1 *and* are of the WARN type. Any WARN type messages that do not apply to slot 1 do not appear. Any slot 1 messages of other types do not appear.
 - Click the **Show Advanced** button to reveal application options that you can add to the filter. Click an application to apply it to the filter. Press and hold the **Ctrl** key and click additional applications to apply multiple applications to the filter.
5. Click the **Apply** button. All entries that do not match the filter disappear from the display.

Report Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 47](#)
- [“Viewing Port Statistics” on page 47](#)
- [“Graphing Port Statistics” on page 49](#)

Introduction

Use the **Report** menu to view port statistics. The menu allows you to view all relevant statistics in a table, or to select statistics to create a custom graph.

Viewing Port Statistics

To view port statistics:

1. In the chassis display, click the port whose statistics you want to view.
2. Click the **Report** menu and select **Graph Port**. A window opens that displays the type and number of the port.
3. Click the **Interface** tab. A table of port statistics appears. [Table 7-1](#) lists and describes the fields in this table.

Table 7-1: Port Statistics Display Fields

Field	Description
InOctets	Cumulative number of octets that arrived at the port, including framing characters.
InUcastPkts	Cumulative number of incoming packets destined for a single port.

Table 7-1: Port Statistics Display Fields

Field	Description
InMulticastPkts	Cumulative number of incoming packets destined for the ports of a multicast group.
InBroadcastPkts	Cumulative number of incoming packets destined for all ports on the fabric.
InDiscards	Cumulative number of inbound packets that the port discarded for a reason other than a packet error (for example, lack of buffer space).
InErrors	Number of inbound packets with errors that the port discarded.
InUnknownProtos	For packet-oriented interfaces, the number of packets received via the interface that were discarded because of an unknown or unsupported protocol. For character-oriented or fixed-length interfaces that support protocol multiplexing, the number of transmission units received via the interface that were discarded because of an unknown or unsupported protocol. For any interface that does not support protocol multiplexing, this counter is always 0.
OutOctets	Total number of octets transmitted out of the interface, including framing characters.
OutUcastPkts	Total number of packets that higher-level protocols requested be transmitted, and which were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.
OutMulticastPkts	Total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both Group and Functional addresses.
OutBroadcastPkts	Total number of packets that higher-level protocols requested to be transmitted, and which were addressed to a broadcast address at this sub-layer, including those that were discarded or not sent.
OutDiscards	Number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free-up buffer space.
OutErrors	For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.

Configuring Refresh Rate

EM refreshes all statistics displays at regular intervals. To configure the interval:

1. In the chassis display, click the port whose refresh rate you want to change.
2. Click the **Report** menu and select **Graph Port**. A window opens that displays the type and number of the port.
3. Click the pulldown menu at the bottom of the window and select the interval at which you want the display to refresh.



NOTE: You do not need to click any **Apply** or **OK** button. The change takes place immediately.

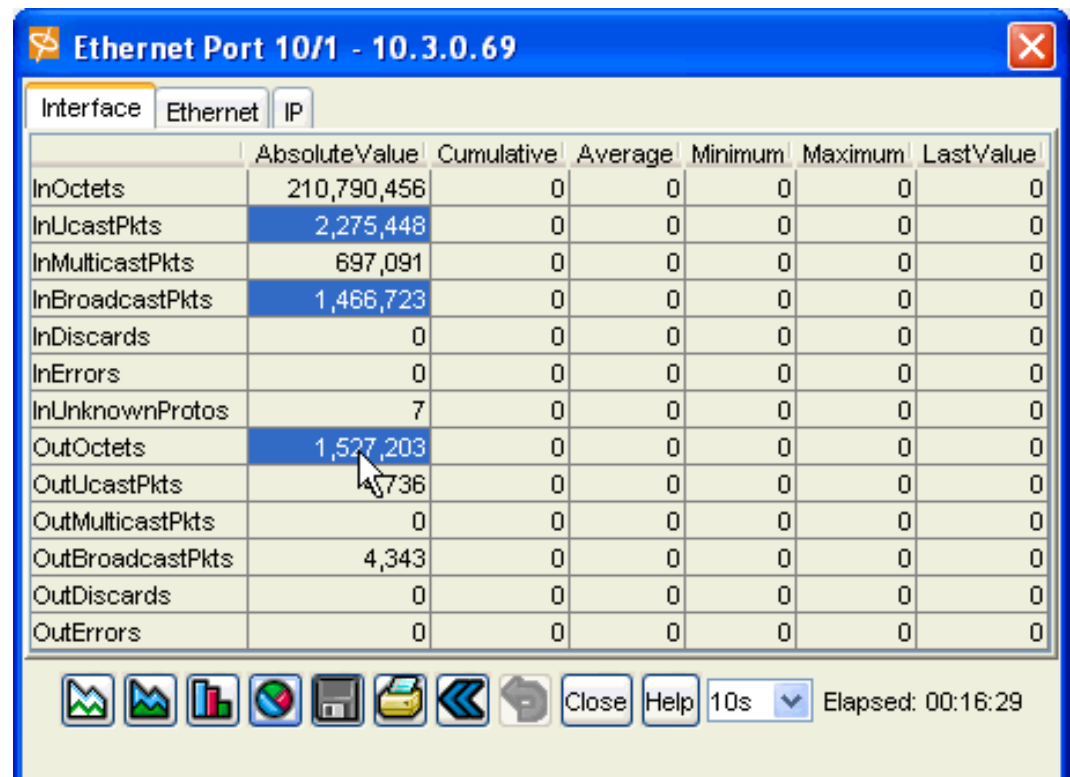
Graphing Port Statistics

EM provides utilities that create line charts, area charts, bar charts, and pie charts to visually represent port statistics.

To graph particular port statistics:

1. In the chassis display, click the port whose statistics you want to view.
2. Click the **Report** menu and select **Graph Port**. A window opens that displays the type and number of the port.
3. Click the **Interface** tab. (Optionally, you can click the **IP**, **Ethernet**, or **FibreChannel** tabs, when available.) A table of port statistics appears.
4. Select the values that you want to include in the graph using one of the following methods:
 - Click and drag your cursor across the values that you want to graph.
 - Hold the **Ctrl** key and click the values that you want to graph.

Example



5. Click the button of the graph that you want to create.



Line Chart



Area Chart



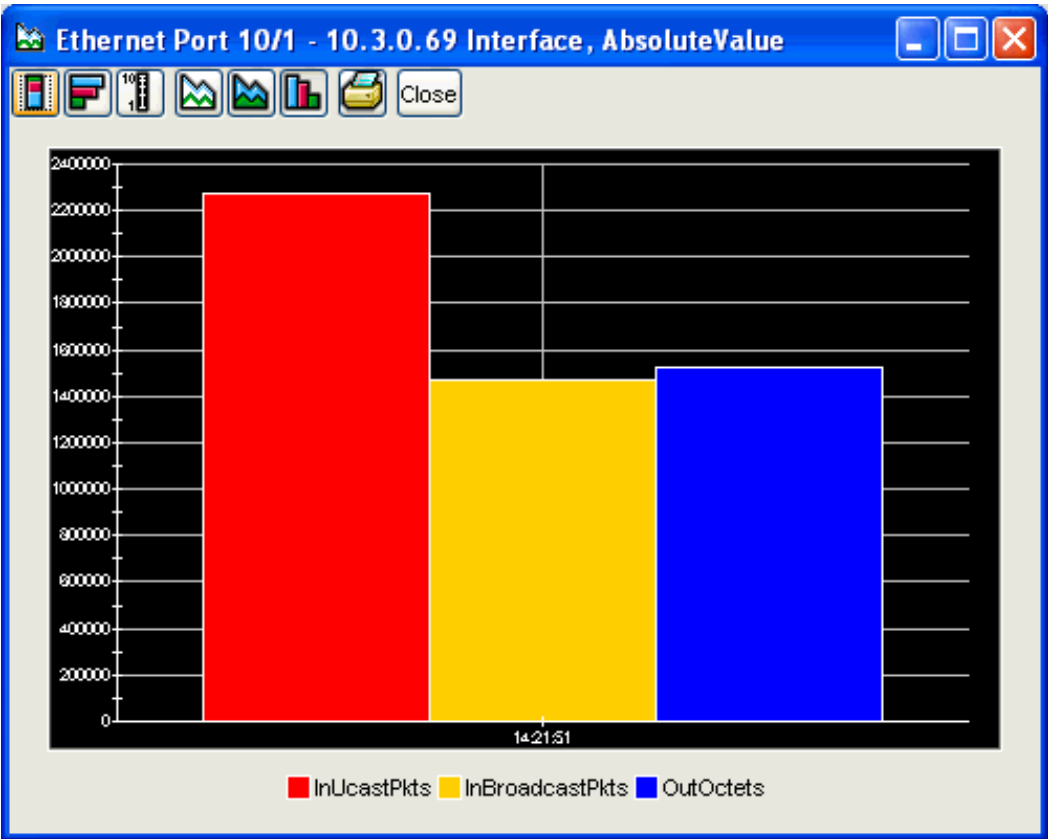
Bar Chart



Figure 7-1: Graph Buttons

The graph appears.

Example



NOTE: With most charts, the display will reload with updated information based on the refresh rate. To configure the interval, refer to [“Configuring Refresh Rate” on page 48](#).

Swapping Chart Type, Layout, and Scale

With the exception of pie charts, the chart display lets you:






- Swap between charts.
- Increase or decrease the scale of the display.
- View the chart horizontally or vertically.

To perform these functions, use the buttons in [Table 7-2](#).

Table 7-2: Chart Buttons

Button	Name	Function
	Stacked	Overlays the graphical output of each statistic.

Table 7-2: Chart Buttons (Continued)

Button	Name	Function
	Horizontal	Rotates the axis of the graph by ninety degrees.
	Log Scale	Zooms in and out.
	Line Chart	Displays a line chart.
	Area Chart	Displays an area chart.
	Bar Chart	Displays a bar chart.

InfiniBand Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 54](#)
- [“Viewing Subnet Manager Properties” on page 59](#)
- [“Viewing Database Synchronization Details” on page 62](#)
- [“Understanding Partitions” on page 62](#)
- [“Viewing Partition Details” on page 66](#)
- [“Viewing Multicast Group Details” on page 66](#)
- [“Viewing Multicast Member Details” on page 67](#)
- [“Viewing InfiniBand Services” on page 67](#)
- [“Viewing Switch Route Details” on page 68](#)
- [“Viewing Switch Element Route Details” on page 68](#)
- [“Adding a Subnet Manager” on page 69](#)
- [“Configuring Subnet Manager Properties” on page 69](#)
- [“Configuring Database Synchronization” on page 71](#)
- [“Viewing the Database Synchronization State” on page 74](#)
- [“Viewing Partitions” on page 74](#)
- [“Viewing Multicast Groups” on page 77](#)
- [“Viewing Infiniband Services” on page 78](#)
- [“Viewing InfiniBand Routes” on page 79](#)
- [“Enabling Performance Management” on page 79](#)
- [“Monitoring Connections” on page 80](#)
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- [“Launching Topology View” on page 89](#)
- [“Viewing Subnet Details” on page 90](#)
- [“Viewing Subnet Management Agents” on page 94](#)
- [“Viewing Device Management” on page 101](#)

Introduction

This section provides information to familiarize you with the InfiniBand technology. For hardware-specific information, consult the relevant hardware documentation.

What is InfiniBand?

InfiniBand (IB) is a high speed, high density serial interconnect that increases CPU utilization, decreases latency, and eases the management pain of data centers. The term InfiniBand refers to the entire hardware, communication, and management infrastructure. Use of this technology increases the communication speed between the following:

- CPUs
- devices within servers
- subsystems located throughout a network

How Does InfiniBand Work?

IB combines high-speed hardware, specialized protocols, and Remote Data Memory Access (RDMA) techniques to increase CPU utilization and decrease latency. Operations of the IB Architecture are managed by the subnet manager (SM).

InfiniBand Components

One or more of the following hardware components may be used to maximize your server network:

- IB switch—passes traffic between IB-capable devices over the IB network
- Host Channel Adapters (installed in host)—serves an IB version of a network interface card (NIC) to connect the host to the IB network

Protocols

IB requires a new set of protocols. All of the necessary protocol drivers are included with the solution.

IPoIB

The IP over IB (IPoIB) link driver provides standardized Internet Protocol encapsulation over IB fabrics. IPoIB can transparently use IP over IB technology, similar to the way that IP runs over Ethernet.

The primary responsibilities of the IPoIB driver are to perform address resolution and the management of multicast membership.

SDP

The Sockets Direct Protocol (SDP) is a transparent protocol used on IB networks to allow sockets-based applications to take advantage of the RDMA performance over an IB network.

SDP provides:

- a reduction in the amount of software running inside a process context
- zero copy

SDP protocol support enables databases, application servers, and CPUs to operate more efficiently because the databases spend less time waiting for work, the application servers spend less time waiting for responses, and the CPUs have more cycles free for other work.

SRP

SCSI RDMA Protocol (SRP) is an upper-layer storage protocol for IB. It runs SCSI commands across RDMA-capable networks for IB hosts to communicate with FC storage devices. This protocol allows IB hosts to natively send SCSI commands as if the storage was direct attached.

The SRP protocol is designed to operate using an RDMA communication service. An RDMA communication service provides communication between pairs of consumers; it uses messages for control information and RDMA operations for data transfers.

The SRP protocol is only used if you have a FC gateway installed in your IB system.

uDAPL

The user Direct Access Programming Library (uDAPL) is a standardized user mode API that natively supports IB fabrics.

uDAPL performs name-to-address translations, establishes connections, and transfers data reliably.

The primary responsibilities of uDAPL are:

- Connection management
- Low latency data transfer and completion

Architectural Elements

The following structures serve as foundational elements of IB architecture:

- Remote Direct Memory Access (RDMA)
- Queue Pairs
- Services

RDMA

IB utilizes Remote Direct Memory Access (RDMA) technology. RDMA is a technology that allows one computer to place information directly into the memory of another computer.

RDMA is specifically characterized by two important features:

- allows user space applications to directly access hardware
- zero-copy data movement

A combination of hardware and software allows user space applications to read and write the memory of a remote system without kernel intervention or unnecessary data copies. Applications place most of the messaging burden upon IB's high-speed network hardware. This results in lower CPU utilization per I/O operation and more efficient use of machine resources.

Queue Pairs

A “verb” is the abstract description that is used to define the functionality of the Host Channel Adapter (HCA). A “verb consumer” refers to the direct user of the verb.

A Work Queue allows a verb consumer to queue up a set of instructions that is executed by the Channel Adapter. There are two types of Work Queues: Send Work Queue (outbound) and Receive Work Queue (inbound). Together these Work Queues create a Queue Pair (QP).

Send and Receive Work Queues are:

- always created as a pair.

- always remain a pair.
- identified by a QP number, which is within the Channel Adapter.

The QP is an addressable entity and is one of the primary architectural elements of IB. In IB, communication occurs between QPs, instead of between ports. The QP is the mechanism by which you define quality of service, system protection, error detection and response, and allowable services.

QPs have:

- a region of memory to be used as buffers (numbers of QPs are only limited by memory).
- a key that must match on each incoming packet (the Q_Key) to verify the validity of the packet.
- (potentially) a Partition Key, which specifies the portion of the fabric that this QP may access.

A connection is made by linking a local QP to a remote QP. Applications do not share QPs; therefore, once you set them up, you can manage them at the application level without incurring the overhead of system calls.

The channel adapter hardware, which executes a queued set of instructions, takes over the task of arbitrating communication in two ways: multiplexing access to the send queue or de-multiplexing messages on the receive queue.

Services

Each QP is independently configured for a particular type of service. These service types provide different levels of service and different error-recovery characteristics.

The available transport-service types include:

- Reliable connection
- Unreliable connection
- Reliable Datagram
- Unreliable Datagram

Once the fabric connections are discovered, QPs and protection domains are established, and the type and quality of service are defined for each QP, the fabric operates reliably and securely at full performance without impact on system hardware or software resources.

Understanding the Subnet Manager

The subnet manager (SM) configures and maintains fabric operations. There can be multiple SMs, but only one master. The SM is the central repository of all information that is required to set up and bring up the IB fabric.

The master SM:

- Discovers the fabric topology.
- Discovers end nodes.
- Configures switches and end nodes with their parameters, such as:
 - Local Identifiers (LIDs)
 - Global Unique Identifier (GIDs)
 - Partition Key (P_Keys)
- Configures switch forwarding tables.
- Receives traps from Subnet Management Agents (SMAs).
- Sweeps the subnet, discovering topology changes and managing changes as nodes are added and deleted.

Subnet Management Agents

Subnet Management Agents (SMA) are part of the SM. An SMA is provided with each node and process packets from the SM.

If an SM is elected master, all of its components, including Subnet Admin (SA), are implicitly elected master. If an SM ceases to be master, all of its components cease responding to messages from clients.

Subnet Manager Hot Standby

The master and slave SMs can be synchronized so the information in the master is carried over to the slave in the event of a fail-over. Refer to [“Enabling SM Database Synchronization” on page 71](#) to configure SM hot standby.

The hot standby/database sync feature is used to synchronize the databases between SMs running on separate chassis.

The SM maintains a data base in the volatile memory of the master SM containing all required information.

How is the synchronization done?

The database synchronization is accomplished in two stages:

1. Cold Synchronization—This stage is initiated by the master SM when it is ready to start a synchronization session with a standby SM. In this stage, all out-of-sync tables are copied from the master SM to the standby SM.
2. Transactional Synchronization—This stage is entered following successful completion of the cold synchronization stage. In this stage, all database update transaction requests that are processed by the master, are replicated to the standby.

What can cause a standby SM to become the master SM?

- A crash of the node running the current master SM
- Partitioning of the subnet (for example, due to link failure)
- Graceful shutdown of the master (for example, for maintenance purposes)

What happens when a master SM fails?

In the event of a failure:

1. The standby SM becomes the new master.
2. The new master rebuilds the database from information retrieved during the subnet discovery phase.
3. Existing LID assignments are retained, where possible.
4. All ports are reset to force them to re-join multicast groups, re-advertise services, re-request event forwarding, and re-establish connections.
5. A “SlaveToMaster” event trap is generated to trigger any necessary processing by external management applications.

Subnet Manager Routing

There are two different concepts associated with IB routing:

- Routing internally within a switch (hops between switch chips)
- Routing between whole switches (hops between nodes), also referred to as routing between “switch elements”

Internal switch routing can be configured to provide the highest performance in passing traffic, and to minimize the threat of congestion within the switch.

The routing process proceeds as follows:

1. The SM first discovers all the IB switch chips in the network.
2. The SM groups the internal switch chips within each chassis into a switch element.
3. The SM process continues until all the IB switches are grouped into switch elements.
4. After all the switch chips are grouped, the SM will route the switch elements according to the routing algorithm discussed in [“Minimum Contention, Shortest Path & Load Balancing Algorithm” on page 58](#).
5. The internal network of each IB switch is then routed based on the best algorithm for each switch element.

Multiple Paths

The SM allows you to define the Logical Identifier Mask Control (LMC) value per subnet. The default value of the LMC is 0, so by default only one Logical Identifier (LID) is assigned to each host port.

Once the LMC value has been assigned, the SM will route different paths for each LID associated with the same host port. The result of these paths is based on the routing algorithm applied.

Understanding SM Routing Terms

The following terms are important to understand before distinguishing the various types of algorithms that the SM uses for routing:

- Distance—is defined as the number of hops (IB switches or switch elements) between source and destination.
- Tolerance—is used when deciding if a particular path is better in distance than the already selected path. You can select the tolerance to be used for shortest path calculation.
 - If the tolerance is set to 0, this means that a path has equal distance in calculating the route as the shortest path only if the path and shortest path have an equal number of hops.
 - If the tolerance is set to 1, this means that a path has equal distance in calculating the route as the shortest path route only if the path has a number of hops equal to either the shortest path or the shortest path plus 1.
- Contention—is declared for every switch port on the path that is already used for routing another LID associated with the same host port.

Minimum Contention, Shortest Path & Load Balancing Algorithm

Minimum Contention, Shortest Path, and Load Balancing is the algorithm that is used by default to route between the switch elements and for routing between the internal IB switch chips within each switch element.

The following algorithm is used for the calculation:

1. The shortest path for each of the host ports is calculated.
2. Contention is calculated for all the available paths that are within the (shortest path + tolerance) distance.
 - a. The path with the least contention is selected.
 - b. If two paths have the same contention, the path with less distance is selected.
 - c. If two paths have the same contention and the same distance, the port usage count is used to provide load balancing over the two paths. The usage count is a measure of how many LIDs have been configured to use that particular port.

Deterministic Source Based Routing Algorithm

The Deterministic Source Based Routing algorithm is used in some High Performance Computing (HPC) environments where the requirements may need to be more stringently defined. An administrator can identify the exact route that a given port and LID takes for traversing through the network.

Configuring Your Network For Optimal Routing

For optimal routing, HP recommends that you:

- Create equal paths between switch elements.
- Determine the first path that will be discovered.

It is recommended that IB switch elements be connected so that all paths between any pair of switch elements are the same distance (in other words, same number of hops), if possible. This enables you to obtain the optimal paths using the default tolerance of 0. If the paths are of different lengths, then the tolerance value will need to be determined.

The SM Routing Algorithm selects the first best path that it finds. If multiple paths with the same properties are available then the first of these paths found is the one that is selected. Therefore, it is possible to set up the cabling between switch elements to force the algorithm to prioritize certain paths. Depending on the network requirements, the prioritized paths can either be concentrated on a particular switch element or spread across multiple switch elements to improve fault tolerance.

Viewing Subnet Manager Properties

To view SM properties:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears. [Table 8-1](#) lists and describes the fields in this window.

Table 8-1: Subnet Manager Properties Window Fields

Field	Description
Subnet Prefix	Displays the subnet prefix of the SM.
GUID	Displays the GUID of the networking device on which the SM runs.
Status	Status of the SM. It may be active or inactive. If active , it is actively managing subnets. If inactive , it is not managing subnets.
Activity Count	Activity counter that increments each time the SM issues a subnet management packet (SMP) or performs other management activities.
SM Key	64-bit subnet management key assigned to the SM. The default is fe:80:00:00:00:00:00:00. The SM key serves as the prefix of all GIDs and “brands” nodes as members of this subnet.

Table 8-1: Subnet Manager Properties Window Fields (Continued)

Field	Description
Priority	Priority of the SM relative to other SMs in the IB network. The lower the number, the greater the priority.
Sweep Interval	Specifies how frequently the SM queries the IB fabric for network changes.
Response Timeout	Maximum amount of time that the SM waits for a response after it sends a packet to a port. If the SM does not receive a response in time, the SM identifies the port as unresponsive.
Master Poll Interval	Interval at which the slave SM polls the master to see if it still runs.
Master Poll Retries	Number of unanswered polls that causes the slave to identify the master as dead.
Max Active SMs	Maximum number of standby SMs that the master supports. A value of 0 indicates unlimited SMs.
LID Mask Control	Number of path bits present in the base LID to each channel adapter port. Increasing the LMC value increases the number of LIDs assigned to each port to increase the number of potential paths to reach each port.

Enabling the Subnet Manager

To enable the SM:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Click the cell in the **Enable** column and select **true** from the pulldown menu that appears.
4. Click the **Apply** button.

Disabling the Subnet Manager

To disable the SM:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Click the cell in the **Enable** column and select **false** from the pulldown menu that appears.
4. Click the **Apply** button.

Configuring the Subnet Manager Priority

To configure SM priority:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **Priority** column and replace it with the value that you want to apply.
4. Click the **Apply** button.

Configuring the Subnet Manager Sweep Interval

To configure the SM sweep interval:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **Sweep Interval** column and replace it with the value that you want to apply.
4. Click the **Apply** button.

Configuring the Subnet Manager Response Timeout

To configure the SM response timeout:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **Response Timeout** column and replace it with the value that you want to apply.
4. Click the **Apply** button.

Configuring the Subnet Manager Master Poll Interval

To configure the interval at which the switch polls the master switch:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **Master Poll Interval** column and replace it with the value that you want to apply.
4. Click the **Apply** button.

Configuring the Subnet Manager Master Poll Retries

To configure the number of failed polls that prompts the slave to identify the master as “down,” perform the following steps:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **Master Poll Retries** column and replace it with the value that you want to apply.
4. Click the **Apply** button.

Configuring the Maximum Number of Active Subnet Managers

To configure the maximum number of active SMs on the IB network:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **LID Mask Control column** and replace it with the value that you want to apply.
4. Click the **Apply** button.

Configuring LID Mask Control

To configure LID mask control:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Subnet Manager** tab. A table of SM properties appears.
3. Highlight the value in the **LID Mask Control column** and replace it with the value that you want to apply.
4. Click the **Apply** button.

Viewing Database Synchronization Details

EM provides multiple screens that you can use to configure database synchronization. Configuration details and field descriptions appear in [“Configuring Database Synchronization” on page 71](#).

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Database Sync** tab. Details appear in the table below the tab.



NOTE: Database synchronization is disabled by default.

Understanding Partitions

A partition defines a set of IB nodes that are permitted to communicate with one another. Partitions provide the following:

- security
- the ability for a large cluster to be divided and isolated into small “sub-clusters”
- mapping of IB nodes to selected VLANs



NOTE: With database sync enabled on all chassis, only the chassis running the master SM will accept partition configuration from the user. For more information, see [“Configuring Database Synchronization” on page 71](#).

How Partitions Work

A partition defines a set of IB nodes that are permitted to communicate with one another. Each node may be part of multiple partitions so that a system administrator can define overlapping partitions as the situation requires. Normal data packets carry a 16-bit P_Key, or Partition Key, that defines a unique partition. The SM configures each node's Channel Adapter with its set of P_Keys. When a packet arrives at a node, the Channel Adapter checks that the packet's P_Key is valid based on the SM's configuration. Packets with invalid P_Keys are discarded. P_Key validation prevents a server from communicating with another server outside of its partition.

IB partitions are comparable to hardware-enforced security features of conventional I/O networking technologies, such as Ethernet VLANs and Fibre-Channel zones.

Partition Members

Without members, a partition doesn't have meaning to the system. Ports are added to the partition, and become members of that partition. Each port may be part of multiple partitions so that the system administrator can define overlapping partitions as the situation requires.

At the time a port member is added to the partition, the administrator must decide whether that particular port will have full or limited membership.

Membership Types

A partition contains a group of members, but different types of members can exist within a single partition. Partition memberships allows even further control because it defines communication within the members of that group, and not just outside of it.

There are two types of partition memberships: full membership, and limited membership. A full-membership partition member can communicate with all other partition members, including other full members, as well as limited members. A limited-membership partition member cannot communicate with other limited-membership partition members. However, a limited partition member can communicate with a full member.

About the Default Partition

The SM automatically configures a default partition, which is always P_Key ff:ff.

The default partition controls all connected ports, and by default, everything is a full-member of the default partition. The default p_key cannot be altered or deleted as it is the controlling mechanism that manages the configuration of all the partitions.

Selecting a P_Key Value

For a list of acceptable P_Key values, refer to Table 6-5 on page 56.

Upon creation, the P_Key value is technically a 15-bit number. However, after the P_Key is created and the port(s) membership type has been established, the entire value becomes 16-bits. The most significant bit (MSB) displays the type of membership (0 = Limited member, 1 = Full member).

When assigning a P_Key value, you need to choose four hexadecimal numbers. However, because of the way that the 16th bit is used, only certain numbers can be used for the left-most variable (the MSB). For example, do not create two P_Keys:

0### and 8###, as they will be viewed as the same number by the system.

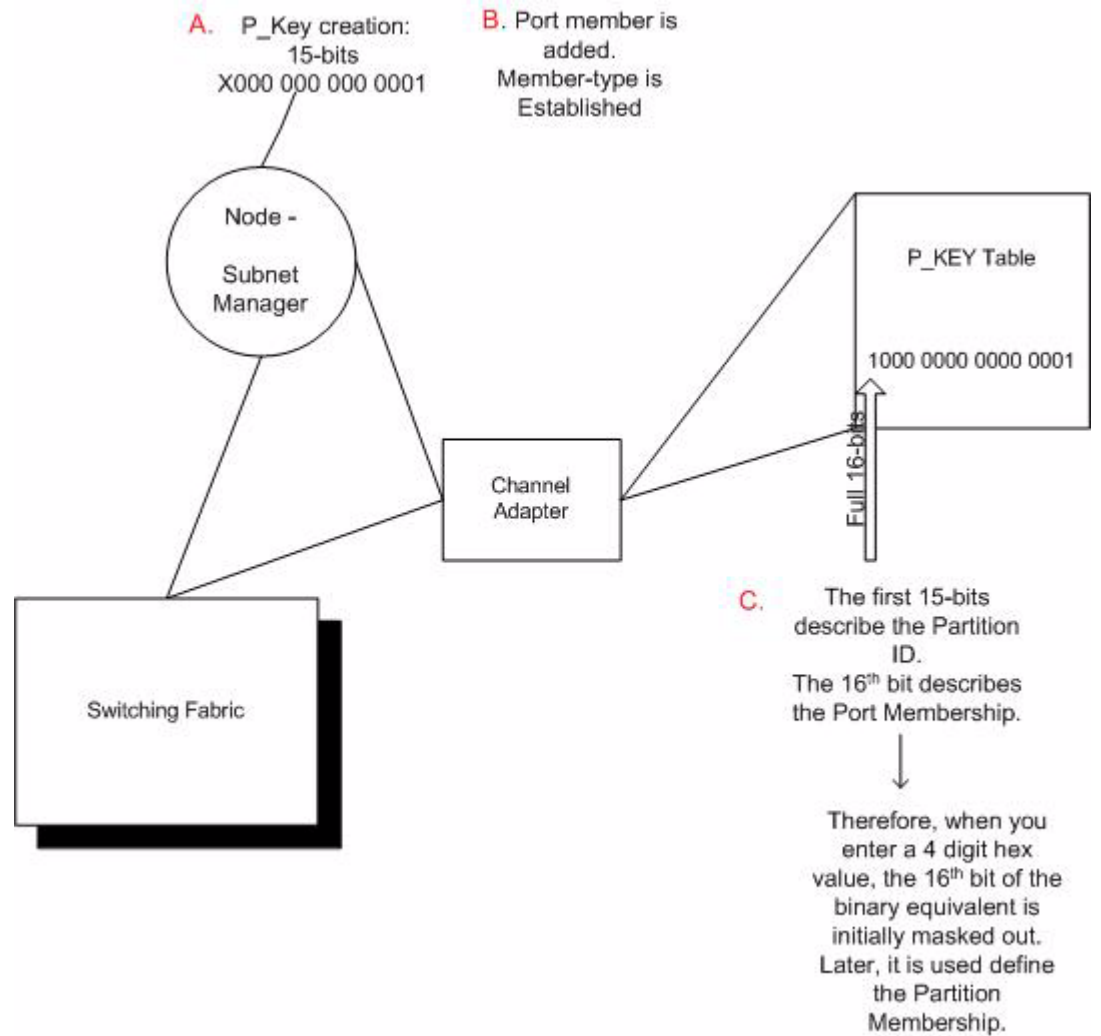


Figure 8-1: Partition Keys

Hex to Binary Conversions

The following table is provided to assist in the creation of P_Keys.

When creating the partition P_Key, enter a hexadecimal value that is the equivalent of 16-bits in binary. For example, enter 80:00 (hex) to be 1000000000000000 (binary).

The default partition, which cannot be altered, is 7f:ff.

Table 8-2: Binary Conversions

Hexadecimal	Binary
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101

Table 8-2: Binary Conversions

Hexadecimal	Binary
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

Examples of Valid P_Key Values

You can choose your own P_Key values, or you can simply choose your values from the list in the following table.

Table 8-3: Valid P_Key Numbers

00:01	00:11
00:02	00:12
00:03	00:13
00:04	00:14
00:05	00:15
00:06	00:16
00:07	00:17
00:08	00:18
00:09	00:19
00:10	00:20

Understanding how P_Keys are Saved

Partition information is saved persistently by the master SM. P_Key information can be synchronized between the master SM and a slave SM. The synchronization of the SMs means that the partition configuration (as well as other information) is exchanged between the active and standby SMs. Therefore, the partition configuration will be transferred in the event that an IB switch should fail.

The partition configuration is not saved persistently on a slave SM.

If you have more than one IB switch in your fabric, refer to [“Enabling SM Database Synchronization” on page 71](#).

If you are configuring one IB switch, it will automatically be the master, and the partition configuration is saved persistently on the switch.

Viewing Partition Details

To view the attributes of the partitions on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Partitions** tab. [Table 8-4](#) lists and describes the fields on this tab.

Table 8-4: Partition Fields

Field	Description
SubnetPrefix	Subnet prefix of the subnet whose partitions you want to view.
Key	Partition key of the partition whose members the display prints below.
VectorIndex	Index identifier of the vector of the partition. This value is available for application purposes.
Vector	Vector of the partition table in which the partition resides. This value is available for application purposes.
VectorSize	Size, in bytes, of the current vector. This value is available for application purposes.
VectorElementSize	Size, in bytes, of each element of the vector. This value is available for application purposes.
LastChange	Indicates the time stamp when the partition table was last changed.

Viewing Multicast Group Details

To view the attributes of the multicast groups on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Multicast Group** tab. [Table 8-5](#) lists and describes the fields on this tab.

Table 8-5: Multicast Group Fields

Field	Description
SubnetPrefix	Subnet prefix of the SM.
MGID	The 128-bit multicast GID address for this multicast group.
QKey	The 16-bit Q-Key of this multicast group.
MLID	The 16-bit LID of this multicast group.
MTU	Maximum transmission unit
TClass	The Tclass to be used in the GRH if GRH is used.
PKey	The 16-bit Partition Key for this multicast group.
Rate	Traffic rate of this multicast group.
PacketLifeTime	Packet life time of this multicast group.
SL	Service level of this multicast group.
FlowLabel	Flow label to be used on this multicast group if GRH is used.
HopLimit	Hop limit to be used on this multicast group if GRH is used.
Scope	Scope of this multicast group.

Viewing Multicast Member Details

To view the attributes of the multicast members on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Multicast Member** tab. [Table 8-5](#) lists and describes the fields on this tab.

Table 8-6: Multicast Member Fields

Field	Description
SubnetPrefix	Subnet prefix of this IB subnet.
MGID	The 128-bit multicast GID address for this multicast group.
VectorIndex	Index identifier of the particular vector of the multicast member table that contains the multicast member. This value is available for application purposes.
Vector	Vector of the multicast member table that contains the multicast member. This value is available for application purposes.
VectorSize	Size of the vector, in bytes, of the multicast member table that contains the multicast member. This value is available for application purposes.
VectorElementSize	Size of the multicast member entry (element) in the multicast member table. This value is available for application purposes.
LastChange	Indicates the time stamp when the multicast member table was last changed.

Viewing InfiniBand Services

Subnet services provide your IB fabric with various features, such as the ability to run particular protocols. To view the subnet services on your IB fabric:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Services** tab. [Table 8-7](#) lists and describes the fields on this tab.

Table 8-7: Services Fields

Field	Description
Subnet Prefix	Subnet prefix of the subnet service.
ID	Unique identifier that the SM assigns to the service.
GID	Services use the same GID as the IB controller (node) on which they run.
PKey	Partition key of the node on which the service runs.
Lease	Lease period remaining (in seconds) for this service. A value of 4294967295 means the lease is indefinite.
Key	The 64-bit service key.
Name	Name of the subnet service.
Data	Data associated with this service.

Viewing Switch Route Details

Switch routes represent the complete path that traffic takes through the IB fabric from the source LID to the destination LID. To view the attributes of the switch routes on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Switch Route** tab. [Table 8-5](#) lists and describes the fields on this tab.

Table 8-8: Switch Route Fields

Field	Description
SubnetPrefix	Subnet prefix of the route.
SourceLID	Source LID of the route.
DestLID	Destination LID of the route.
VectorIndex	Index identifier of the particular vector of the route table that contains the route. This value is available for application purposes.
Vector	Vector of the route table that contains the route. This value is available for application purposes.
VectorSize	Size of the vector, in bytes, of the route table that contains the route. This value is available for application purposes.
VectorElementSize	Size of the route entry (element) in the route table. This value is available for application purposes.
LastChange	Indicates the time stamp when the route table was last changed.

Viewing Switch Element Route Details

To view the attributes of the switch element routes on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management (tabular format)**. The **Subnet Manager** window opens.
2. Click the **Switch Element Route** tab. [Table 8-9](#) lists and describes the fields on this tab.

Table 8-9: Switch Element Route Fields

Field	Description
SubnetPrefix	Subnet prefix of this IB subnet.
SourceLID	Source LID of the route.
DestLID	Destination LID of the route.
VectorIndex	Index identifier of the particular vector of the route table that contains the route. This value is available for application purposes.
Vector	Vector of the route table that contains the route. This value is available for application purposes.
VectorSize	Size of the vector, in bytes, of the route table that contains the route. This value is available for application purposes.
VectorElementSize	Size of the route entry (element) in the route table. This value is available for application purposes.
LastChange	Indicates the time stamp when the route table was last changed.

Adding a Subnet Manager

To add an SM to your switch:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. In the left-hand navigation bar, click **Subnet Managers**. The **Subnet Managers** display appears in the right-hand portion of the window.
3. Click the **Add** button in the bottom-right-hand section of the window. The **Add Subnet Manager** window opens.
4. Enter a subnet prefix in the **Subnet Prefix** field.
5. Enter a subnet priority level in the **Priority** field.
6. (Optional) Enter a subnet management key in the **smKey** field.
7. (Optional) Enter a value in the **LID Mask Control** field to increase the number of LIDs assigned to each port to increase the number of potential paths to reach each port.
8. Click the **Add** button. The new SM appears in the **Summary** table in the **Subnet Managers** display.

Removing a Subnet Manager

To remove an SM from your switch:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. In the left-hand navigation bar, click **Subnet Managers**. The **Subnet Managers** display appears in the right-hand portion of the window.
3. Click the SM, in the **Summary** table in the **Subnet Managers** display, that you want to remove.
4. Click the **Remove** button. The entry disappears from the display and the switch configuration.

Configuring Subnet Manager Properties

SMs provide a number of user-configurable attributes. The sections that follow explain each attribute and describe how to configure them.

Configuring SM Priority

Every SM in the IB network carries a priority value, and at any given time the SM with the highest integer value priority becomes the master SM. To configure the SM priority on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **Priority** field. Remember, the higher the integer value, the higher the priority.
4. Click the **Apply** button.

Configuring Sweep Interval

The sweep interval specifies how frequently the SM queries the IB fabric for network changes. To configure the sweep interval on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **Sweep Interval** field. This interval represents the number of seconds between sweeps.
4. Click the **Apply** button.

Configuring Response Timeout

The response timeout of an SM specifies the maximum amount of time that the SM waits for a response after it sends a packet to a port. If the SM does not receive a response in the response-time interval, the SM identifies the port as unresponsive. To configure the response timeout:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **Response Timeout** field. The SM measures response timeout in milliseconds.
4. Click the **Apply** button.

Configuring the Master Poll Interval

The master poll interval determines the interval at which the slave SM polls the master to see if the master still runs. To configure the master poll interval:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **Master Poll Interval** field. The value represents the interval, in seconds.
4. Click the **Apply** button.

Configuring the Number of Master Poll Retries

The master poll retries value specifies the number of unanswered polls that cause the slave to identify the master as dead. To configure this value:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **Master Poll Retries** field.
4. Click the **Apply** button.

Configuring the Maximum Number of Active Standby SMs that the Master SM Supports

To configure an unlimited number of active standby (slave) SMs, enter a value of 0. To configure this value:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **Max active SMs** field.
4. Click the **Apply** button.

Configuring LID Mask Control

LID mask control assigns the number of path bits present in the base LID to each Channel Adapter port. Increasing the LMC value increases the number of LIDs assigned to each port to increase the number of potential paths to reach each port. To configure LID mask control:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Enter an integer value in the **LID Mask Control** field.
4. Click the **Apply** button.

Configuring Database Synchronization

The database synchronization feature propagates information from the database of the master SM to the standby SMs. The sections that follow describe how to configure this feature.



NOTE: With database sync enabled on all chassis, only the chassis running the master SM will accept partition configuration from the user. For more information, see [“How Partitions Work” on page 63](#).

Enabling SM Database Synchronization

If you are configuring more than one IB chassis in your fabric, it is likely that you will want to enable database synchronization of the SMs.



NOTE: This features is enabled by default.

Enable SM database synchronization to update standby SMs with information in the master SM.

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Check the **Enable** checkbox in the **SM Database Synchronization** field.

5. Click the **Apply** button.

Configuring the Maximum Number of Backup Subnet Managers to Synchronize

To configure the maximum number of backup SMs that will synchronize with the master SM:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the **Max Backup SMs** field.
5. Click the **Apply** button.

Configuring Session Timeout

To configure the interval, in seconds, during which a synchronization session status MAD packet must arrive at the master SM to maintain synchronization:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the Session Timeout field. This value determines the timeout duration, in seconds.
5. Click the **Apply** button.

Configuring the Poll Interval

To configure the interval, in seconds, at which the master SM polls an active slave SM to verify synchronization:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the **Poll Interval** field. This value sets the poll interval, in seconds.
5. Click the **Apply** button.

Configuring the Cold Sync Timeout Value

To configure the amount of time, in seconds, that a cold synchronization tries to initiate before it times out:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.

4. Enter an integer value in the **Cold Sync Timeout** field. This value sets the timeout interval, in seconds.
5. Click the **Apply** button.

Configuring the Cold Sync Limit Value

To configure the maximum number of cold synchronizations to perform during a given cold sync period:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the **Cold Sync Limit** field. This value sets the maximum number of syncs that can occur during the sync period (page 73).
5. Click the **Apply** button.

Configuring the Cold Sync Limit Period

To specify the length of the interval during which cold synchronizations may occur:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the **Cold Sync Limit Period** field. This value sets the length of the interval during which cold syncs may occur.
5. Click the **Apply** button.

Configuring the New Session Delay

To specify the amount of time that the master SM waits before it attempts to initiate a synchronization session with a new SM:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the **New Session Delay** field. This value determines the amount of time, in seconds, that the master SM waits before it attempts to initiate a synchronization session with a new SM.
5. Click the **Apply** button.

Configuring the Resync Interval

To specify the interval at which the master SM sends a resynchronization request to all active sync sessions:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. Enter an integer value in the **Resync Interval** field. This value specifies the interval, in seconds, at which the master SM sends a resynchronization request to all active sync sessions.
5. Click the **Apply** button.

Viewing the Database Synchronization State

To verify that the master SM and slave SM(s) are in sync:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the SM that you want to configure. Each SM appears in the left-hand navigation window with an SM icon (☺).
3. Click the **Database Sync** tab in the right-hand panel of the display.
4. View the **State** field.

Viewing Partitions

To view the partitions on your IB network:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the **Partitions** (⊗) branch. The Partitions summary appears in the right-hand display. [Table 8-10](#) lists and describes the fields in this display.

Table 8-10: Partitions Summary Fields

Field	Description
Partition Key	Partition key (numeric identifier) of the partition.
Full Member Count	Number of full partition members.
Limited Member Count	Number of limited partition members.

Creating a Partition

To create an IB partition:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.

3. Click the **Partitions** (⌘) branch.
4. Click the **Add** button. The **Add Partition** window opens.
5. Enter a partition key for the new partition in the **PKey** field, then click the **Add** button.

Removing a Partition

To delete a partition:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the **Partitions** (⌘) branch.
4. Click the partition, in the **Summary** display, that you want to remove, then click the **Remove** button.

Viewing Partition Details

To view partition details:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the plus sign (+) next to the **Partitions** (⌘) branch to display all partitions in the left-hand navigation menu.
4. Click the partition key of the partition whose details you want to view. The members (full and limited) of the partition appear in the display.



NOTE: To view the GUIDs of the Server Switch management ports in the display, click the **Show Switch Mgmt Ports** button. Click the **Hide Switch Mgmt Ports** button to remove these GUIDs from the display.

Adding Full Members to a Partition

Full members of a partition can communicate to other full members and to limited members.

Adding Available Members

To add a port from the **Available Members** pool to a partition as a full member:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the plus sign next to the **Partitions** (⌘) branch to display all partitions in the left-hand navigation menu.
4. Click the partition key of the partition to which you want to add members. The members (full and limited) of the partition appear in the display.
5. Click the port, in the **Available Members** field, that you want to add to the partition, then click the right-pointing arrow next to the **Full Members** field.

Adding Unavailable Members

To add a partition member that does not appear in the Available Members pool:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the plus sign next to the **Partitions** (⌘) branch to display all partitions in the left-hand navigation menu.
4. Click the partition key of the partition to which you want to add members. The members (full and limited) of the partition appear in the display.
5. Click the **Add Other** button. The **Add Other Partition Member** window opens.
6. Enter the GUID of the host that includes the port(s) that you want to add to the partition in the **Node GUID** field.
7. Specify the port(s) that you want to add to the partition in the **Port** field.
8. Click the **Full** radio button, then click the **Add** button.

Adding Limited Members to a Partition

Limited members of a partition can communicate with full members of the partition, but not with other limited members.

Adding Available Members

To add a port from the **Available Members** pool to a partition as a limited member:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the plus sign next to the **Partitions** (⌘) branch to display all partitions in the left-hand navigation menu.
4. Click the partition key of the partition to which you want to add members. The members (full and limited) of the partition appear in the display.
5. Click the port, in the **Available Members** field, that you want to add to the partition, then click the right-pointing arrow next to the **Limited Members** field.

Adding Unavailable Members

To add a partition member that does not appear in the Available Members pool:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the plus sign next to the **Partitions** (⌘) branch to display all partitions in the left-hand navigation menu.
4. Click the partition key of the partition to which you want to add members. The members (full and limited) of the partition appear in the display.
5. Click the **Add Other** button. The **Add Other Partition Member** window opens.
6. Enter the GUID of the node that includes the port(s) that you want to add to the partition in the **Node GUID** field.

7. Specify the port(s) that you want to add to the partition in the **Port** field.
8. Click the **Limited** radio button, then click the **Add** button.

Viewing Multicast Groups

To view the multicast groups on your IB network:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose partitions you want to view. The left-hand navigation menu expands.
3. Click the **Multicast Groups** (🔗) branch. The multicast groups summary appears in the right-hand display. [Table 8-11](#) lists and describes the fields in this display.

Table 8-11: Multicast Group Summary Field Descriptions

Field	Description
MGID	Numeric multicast group identifier of each multicast group on the IB fabric.
QKey	The 16-bit Q-Key of this multicast group.
MTU	Maximum transmission unit of the multicast group.
PKey	Partition key of the multicast group.

Viewing Multicast Group Details

To view multicast group details:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose multicast groups you want to view. The left-hand navigation menu expands.
3. Click the plus sign next to the **Multicast Groups** (🔗) branch to display all groups in the left-hand navigation menu.
4. Click the MGID of the multicast group whose details you want to view, then click the **General** tab. MC group details appear in the display. [Table 8-12](#) lists and describes the fields in this display.

Table 8-12: Multicast Group General Details Fields

Field	Description
QKey	The 16-bit Q-Key of this multicast group.
MLID	The 16-bit LID of this multicast group
MTU	Maximum transmission unit of the multicast group.
TClass	The Tclass to be used in the GRH if GRH is used.
PKey	Partition key of the multicast group.
Rate	Traffic rate of this multicast group.
Packet Life Time	Packet life time of this multicast group.
SL	Service level of this multicast group.
Flow Label	Flow label to be used on this multicast group if GRH Is used.
Hop Limit	Hop limit to be used on this multicast group if GRH Is used.
Scope	Scope of this multicast group.

Viewing Multicast Group Members

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose multicast groups you want to view. The left-hand navigation menu expands.
3. Click the plus sign next to the **Multicast Groups** (🔗) branch to display all groups in the left-hand navigation menu.
4. Click the MGID of the multicast group whose details you want to view, then click the **Members** tab. MC group members appear in the display. [Table 8-13](#) lists and describes the fields in this display.

Table 8-13: Multicast Group Members Fields

Field	Description
Port GID	Global identifier of the member port.
Join State	Displays whether the port is a full member or limited member of the group.
Proxy Join Status	Displays true or false.

Viewing Infiniband Services

To view the IB services that run on your switch:

1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose services you want to view. The left-hand navigation menu expands.
3. Click the **Services** (🔗) branch. Details of IB services appear in the right-hand display. [Table 8-14](#) lists and describes the fields in the **Summary** section of the display.

Table 8-14: Services Summary Fields

Field	Description
Name	ASCII identifier of the service
Service Id	Numeric identifier that nodes use to call the service.
Service GID	64-bit ID of the service.
PKey	128-bit multicast GID address.

[Table 8-15](#) lists and describes the fields in the **Details** section of the display.

Table 8-15: Services Details Fields

Field	Description
Service Name	ASCII identifier of the service
Service Id	Numeric identifier that nodes use to call the service.
Service GID	GID of the node that provides the service.
Service PKey	16-bit P-Key.
Lease	Lease period remaining (in seconds) for this service. A value of 4294967295 means the lease is indefinite.

Table 8-15: Services Details Fields

Field	Description
Key	64-bit service key.
Data (8 bit)	Header of the data type 8.
Data (16 bit)	Header of the data type 16.
Data (32 bit)	Header of the data type 32.
Data (64 bit)	Header of the data type 64.

Viewing InfiniBand Routes

To view the IB routes that run on your switch:


1. Click the **InfiniBand** menu and select **Subnet Management**. The **Subnet Management** window opens.
2. Click the plus sign (+) next to the SM whose services you want to view. The left-hand navigation menu expands.
3. Click the **Routes** () branch. IB routes fields appear in the right-hand display.
4. Enter the source LID of the route in the **Source LID** field.
5. Enter the destination lid of the route in the **Destination LID** field.
6. Click the **Show Route** button.
7. Click the **Switch Route** tab. [Table 8-16](#) lists and displays the fields on this tab.

Table 8-16: Switch Route Fields

Field	Description
Node GUID	Global unique ID of the node.
In Port	Port of ingress.
Out Port	Port of egress

8. Click the **Switch Element Route** tab. [Table 8-17](#) lists and displays the fields on this tab.

Table 8-17: Switch Element Route Fields

Field	Description
Chassis GUID	Global unique ID of the node.
In Port	Port of ingress.
Out Port	Port of egress.

Enabling Performance Management

To enable IB-port performance management:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the subnet of the ports that you want to manage (for instance, fe:80:00:00:00:00:00). The **Port Counter Configuration** display appears in the right-hand pane of the window.

3. Click the **Enable** radio button.

Disabling Performance Management

To disable performance management:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the subnet of the ports that you want to manage (for instance, fe:80:00:00:00:00:00). The **Port Counter Configuration** display appears in the right-hand pane of the window.
3. Click the **Disable** radio button.

Monitoring Connections

To monitor connections, you must do the following:

- [“Defining a Connection to Monitor” on page 80](#)
- [“Viewing Monitored Connections” on page 81](#)
- [“Viewing Connection Counters” on page 81](#)
- [“Viewing Connection Monitor Counters” on page 82](#)
- [“Testing Connections” on page 82](#)
- [“Viewing Port Counters of Connections” on page 82](#)

Defining a Connection to Monitor

To create a connection to monitor:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the **Connection Counters** branch. The **Monitored Connection** tab appears in the right-hand pane of the window.
4. Click the **Add** button. The **Add Connection** window opens.
5. Enter a source LID in the **Source LID** field.



NOTE: To view available source and destination LIDs, return to the main EM display, click the **InfiniBand** menu, select **Subnet Management (tabular format)**, then click the **SwitchRoute** tab. For more details, refer to [“Viewing Switch Route Details” on page 68](#).

6. Enter a destination LID in the **Destination LID** field.
7. Check the **Enable Connection Monitoring** checkbox.



NOTE: If this checkbox is not selected, you can view only counter information and cannot view monitoring information.

8. Click the **Add** button. The connection entry appears under the **Monitored Connections** tab.

Viewing Monitored Connections

These instructions assume that you have already defined connections to monitor. To view monitored connections:


1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the **Connection Counters** branch. The **Monitored Connection** tab appears in the right-hand pane of the window. [Table 8-18](#) lists and describes the fields on this tab.

Table 8-18: Monitored Connections Fields

Field	Description
Subnet Prefix	Subnet prefix of the monitored connection.
Source LID	16-bit source Logical ID of the connection.
Destination LID	16-bit destination Logical ID of the connection.
Error Status	Displays unknown, exceeded, or notExceeded to indicate if the error value has exceeded the threshold that you configured. To configure thresholds, refer to “Configuring Port Monitoring Thresholds” on page 87 .
Util Status	Displays unknown, exceeded, or notExceeded to indicate if the utilization value has exceeded the threshold that you configured. To configure thresholds, refer to “Configuring Port Monitoring Thresholds” on page 87 .

Viewing Connection Counters

To view connection counters:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands.
4. Click the icon () of the connection whose counters you want to view.
5. Click the **Connection Counters** tab. [Table 8-19](#) lists and describes the fields on this tab.



NOTE: Each hop in the display is a port on a node. When connections move through nodes, they enter the node in one hop (GUID A, port a), and exit in another hop (GUID A, port b). Though the GUIDs of subsequent hops may match, the ports do not match.

Table 8-19: Connection Counters Fields

Field	Description
Subnet Prefix	Subnet prefix of the subnet on which each hop resides.
Node Guid	Global unique ID of the node (switch chip, HCA, or TCA) of the next-hop port.
Port Number	Port number (on the appropriate node) of the hop.

Viewing Connection Monitor Counters

To view connection monitor counters:



1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands.
4. Click the icon () of the connection whose counters you want to view.
5. Click the **Connection Monitor Counters** tab. [Table 8-20](#) lists and describes the fields on this tab.

Table 8-20: Port Errors and Port Util Errors Fields

Field	Description
Node Guid	Global unique ID of the IB node of the hop port.
Port Number	Port number of the hop.

Testing Connections

To test connections:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands.
4. Click the icon () of the connection whose counters you want to view.
5. Click the **Test Connection** tab.
6. Click the **Test** button.

Viewing Port Counters of Connections

To view port counters:


1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands.
4. Click the plus sign next to the icon () of the connection whose port counters you want to view. The navigation tree expands.
5. Click the port (in GUID - port-number format) whose counters you want to view. [Table 8-21](#) lists and describes the fields in this display.

Table 8-21: Port Counters Fields

Field	Description
Subnet Prefix	Subnet prefix of the subnet on which each hop resides.
Node Guid	Global unique ID of the node (switch chip, HCA, or TCA) of the next-hop port.

Table 8-21: Port Counters Fields

Field	Description
Port Number	Port number (on the appropriate node) of the hop.
Symbol Errors	Total number of symbol errors detected on one or more lanes.
Link Recovery Errors	Total number of times the port training state machine has successfully completed the link error recovery process.
Link Downs	Total number of times the port training state machine has failed the link error recovery process and downed the link.
Received Errors	Total number of packets containing an error that were received on the port. These errors include: <ul style="list-style-type: none"> • Local physical errors (ICRC, VCRC, FCCRC, and all physical errors that cause entry into the bad state) • Malformed data packet errors (Lver, length, VL) • Malformed link packet errors (operand, length, VL) • Packets discarded due to buffer overrun
Received Remote Physical Errors	Total number of packets marked with the EBP delimiter received on the port.
Received Switch Relay Errors	Total number of packets received on the port that were discarded because they could be forwarded by the switch relay. Reasons for this include: <ul style="list-style-type: none"> • DLID mapping • VL mapping • Looping (output port = input port)
Transmit Discards	Total number of outbound packets discarded by the port because the port is down or congested. Reasons for this include: <ul style="list-style-type: none"> • Output port is in the inactive state. • Packet length exceeded neighbor MTU. • Switch lifetime limit exceeds. • Switch HOQ limit exceeds.
Transmit Constraint Errors	Total number of packets not transmitted from the port for the following reasons: <ul style="list-style-type: none"> • FilterRawOutbound is true and packet is raw. • PartitionEnforcementOutbound is true and packet fails partition key check, IP version check, or transport header version check.
Received Constraint Errors	Total number of packets received on the port that are discarded for the following reasons: <ul style="list-style-type: none"> • FilterRawInbound is true and packet is raw. • PartitionEnforcementInbound is true and packet fails partition key check, IP version check, or transport header version check.
Logical Link Integrity Errors	The number of times that the frequency of packets containing local physical errors exceeded local_phy_errors.

Table 8-21: Port Counters Fields

Field	Description
Excessive Buffer Overrun Errors	The number of times that overrun errors' consecutive flow control update periods occurred with at least one overrun error in each period.
VL15 Dropped	Number of incoming VL15 packets dropped due to resource limitations on port selected by PortSelect.
Transmit Data	Optional; will be zero if not implemented. Total number of data octets, divided by 4, transmitted on all VLs from the port selected by PortSelect. This includes all octets between (and not including) the start of packet delimiter and VCRC. It excludes all link packets. Implementers may choose to count data octets in groups larger than four but are encouraged to choose the smallest group possible. Results are still reported as a multiple of four octets.
Received Data	Optional; will be zero if not implemented. Total number of data octets, divided by 4, received on all VLs from the port selected by PortSelect. This includes all octets between (and not including) the start of packet delimiter and VCRC. It excludes all link packets. Implementers may choose to count data octets in groups larger than four but are encouraged to choose the smallest group possible. Results are still reported as a multiple of four octets.
Transmit Packets	Optional; will be zero if not implemented. Total number of data packets, excluding link packets, transmitted on all VLs from the port selected by PortSelect.
Received Packets	Optional; will be zero if not implemented. Total number of data packets, excluding link packets, received on all VLs from the port selected by PortSelect.

Viewing Port Counters

To view port counters:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Port Counters** branch. The navigation tree expands.
4. View port counters with one of the following methods:
 - Click the GUID whose port counters you want to view; all available port counters appear.
 - Click the plus sign next to the GUID of the node whose port counters you want to view, then click the port whose counters you want to view; counters appear for that individual port.

[Table 8-22](#) lists and describes the fields in the **Port Counters** display.

Table 8-22: Port Counters Fields

Field	Description
Subnet Prefix	Subnet prefix of the subnet on which each hop resides.
Node Guid	Global unique ID of the node (switch chip, HCA, or TCA) of the next-hop port.
Port Number	Port number (on the appropriate node) of the hop.
Symbol Errors	Total number of symbol errors detected on one or more lanes.
Link Recovery Errors	Total number of times the port training state machine has successfully completed the link error recovery process.
Link Downs	Total number of times the port training state machine has failed the link error recovery process and downed the link.
Received Errors	Total number of packets containing an error that were received on the port. These errors include: <ul style="list-style-type: none"> Local physical errors (ICRC, VCRC, FCCRC, and all physical errors that cause entry into the bad state) Malformed data packet errors (Lver, length, VL) Malformed link packet errors (operand, length, VL) Packets discarded due to buffer overrun
Received Remote Physical Errors	Total number of packets marked with the EBP delimiter received on the port.
Received Switch Relay Errors	Total number of packets received on the port that were discarded because they could be forwarded by the switch relay. Reasons for this include: <ul style="list-style-type: none"> DLID mapping VL mapping Looping (output port = input port)
Transmit Discards	Total number of outbound packets discarded by the port because the port is down or congested. Reasons for this include: <ul style="list-style-type: none"> Output port is in the inactive state. Packet length exceeded neighbor MTU. Switch lifetime limit exceeds. Switch HOQ limit exceeds.
Transmit Constraint Errors	Total number of packets not transmitted from the port for the following reasons: <ul style="list-style-type: none"> FilterRawOutbound is true and packet is raw. PatitionEnforcementOutbound is true and packet fails partition key check, IP version check, or transport header version check.

Table 8-22: Port Counters Fields

Field	Description
Received Constraint Errors	Total number of packets received on the port that are discarded for the following reasons: <ul style="list-style-type: none"> FilterRawInbound is true and packet is raw . PartitionEnforcementInbound is true and packet fails partition key check, IP version check, or transport header version check.
Logical Link Integrity Errors	The number of times that the frequency of packets containing local physical errors exceeded local_phy_errors.
Excessive Buffer Overrun Errors	The number of times that overrun errors consecutive flow control update periods occurred with at least one overrun error in each period.
VL15 Dropped	Number of incoming VL15 packets dropped due to resource limitations on port selected by PortSelect.
Transmit Data	Optional; will be zero if not implemented. Total number of data octets, divided by 4, transmitted on all VLs from the port selected by PortSelect. This includes all octets between (and not including) the start of packet delimiter and VCRC. It excludes all link packets. Implementers may choose to count data octets in groups larger than four but are encouraged to choose the smallest group possible. Results are still reported as a multiple of four octets.
Received Data	Optional; will be zero if not implemented. Total number of data octets, divided by 4, received on all VLs from the port selected by PortSelect. This includes all octets between (and not including) the start of packet delimiter and VCRC. It excludes all link packets. Implementers may choose to count data octets in groups larger than four but are encouraged to choose the smallest group possible. Results are still reported as a multiple of four octets.
Transmit Packets	Optional; will be zero if not implemented. Total number of data packets, excluding link packets, transmitted on all VLs from the port selected by PortSelect.
Received Packets	Optional; will be zero if not implemented. Total number of data packets, excluding link packets, received on all VLs from the port selected by PortSelect.

Viewing Cumulative Port Counters

To view cumulative port counters:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Port Counters** branch. The navigation tree expands.
4. Click the plus sign next to the node of the port whose cumulative counters you want to view. The navigation tree expands.

5. Click the port whose navigation counters you want to view.
6. Click the **Port Cumulative Counters** tab. [Table 8-23](#) lists and describes the fields in the display.

Table 8-23: Cumulative Port Counters Fields

Field	Description
Subnet Prefix	Subnet prefix of the subnet on which each hop resides.
Node Guid	Global unique ID of the node (switch chip, HCA, or TCA) of the next-hop port.
Port Number	Port number (on the appropriate node) of the hop.

Enabling Port Monitoring

To enable port monitoring:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the **Port Monitor** branch.
4. Click the **General** tab.
5. Select **Enable** from the **State** pulldown menu.



NOTE: **Enable** will enable the port monitoring for only the ports that are configured in the Monitor Port Config table, whereas **enableAll** will enable the port monitoring for all ports regardless of whether the port is configured in the Monitor Port Config table or not.

6. Click the **Apply** button.

Configuring Port Monitoring

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the **Port Monitor** branch.
4. Click the **General** tab.
5. Enter an integer value, between 1 and 600, in the **Polling Period** field to configure the number of seconds between polls.
6. Enter an integer value, between 1 and 600, in the **Start Delay** field to configure the delay between startup and polling.

Configuring Port Monitoring Thresholds

To configure port monitoring thresholds:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.

3. Click the **Port Monitor** branch.
4. Click the **Threshold** tab.
5. Enter an integer value in the fields where you want to apply a threshold. Enter **none** in the fields to which you do not want to apply a threshold.
6. Click the **Apply** button.

Resetting Counters

You can reset counters for:

- A hop.
- All ports on a node.
- All ports in a connection.

Resetting Counters on a Hop

To reset counters on a hop:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands and connections appear.
4. Click the plus sign next to the connection that includes the hop that you want to clear. The navigation tree expands and hops appear.
5. Right-click the hop whose counters you want to clear and select **Clear counters on this Hop** from the right-click menu.

Resetting Counters on All Ports on a Node

To reset counters on a node:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands and connections appear.
4. Click the plus sign next to the connection that includes the node that you want to clear. The navigation tree expands and nodes appear.
5. Right-click the node whose counters you want to clear and select **Clear counters on this Node** from the right-click menu.

Resetting Counters on All Ports in a Connection

To reset counters on a hop:

1. Click the **InfiniBand** menu and select **Performance Management**. The **Performance Management** window opens.
2. Click the plus sign (+) next to the subnet of the connections that you want to monitor. The navigation tree expands.
3. Click the plus sign next to the **Connection Counters** branch. The navigation tree expands and connections appear.









- Right-click the connection whose counters you want to clear and select **Clear counters on this Connection** from the right-click menu.

Launching Topology View

To launch the **Topology** view:

- Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
- (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
- Click the **OK** button. The **InfiniBand Topology** window appears. Navigation buttons appear at the top of the **InfiniBand Topology** window. [Table 8-24](#) lists and describes these buttons.

Table 8-24: InfiniBand Topology Navigation Buttons







Button ¹	Description
Refresh 	Refreshes the topology display.
Layout 	Evenly arranges the switch and HCA icons.
Zoom In 	Enlarges the display.
Zoom Out 	Condenses the display.
Fit to Screen 	Zooms in or out to fit the topology in the window.
Specify Topspin Devices 	Opens the Specify Topspin Devices dialog box to add switches to the display.
Legend 	Displays the different colors that represent different types of links.
Subnet Details Details	Displays subnet details. For more information, refer to “Viewing Subnet Details” on page 90 .
Help 	Launches on-line help.

Viewing Internal Server Switch Components

To view the switches and target Channel Adapters (TCAs) inside a server switch:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the Topology View display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens. Navigation buttons appear at the top of the **Internal InfiniBand Topology** window. [Table 8-25](#) lists and describes these buttons.

Table 8-25: Internal InfiniBand Topology Navigation Buttons

Button	Description
Layout 	Evenly arranges the switch and HCA icons.
Zoom In 	Enlarges the display.
Zoom Out 	Condenses the display.
Fit to Screen 	Zooms in or out to fit the topology in the window.
Layout 	Evenly arranges the switch and HCA icons.
Subnet Management Agents SMAs	Displays SM agent details. For information, refer to “Viewing Subnet Management Agents” on page 94.
Help 	Launches on-line help.

Viewing Subnet Details

You can view any of the following subnet details:

- nodes
- ports
- switches
- neighbors

Viewing Nodes

To view the nodes in the **Topology** view:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Click the **Details** button. The **InfiniBand Subnet Details** window opens.
5. Click the **Nodes** tab. [Table 8-26](#) lists and describes the fields on this tab.

Table 8-26: Nodes Tab Fields

Field	Description
SubnetPrefix	The subnet prefix of the node.
GUID	The global unique ID (GUID) of the node.
Description	An optional text string describing this node.
Type	Type of node being managed.
NumPorts	Number of physical ports on this node.
SystemImageGUID	The system image GUID of this node. All nodes within a particular system (chassis) are assigned the same system image GUID.

Viewing Ports

To view the ports in the **Topology** view:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Click the **Details** button. The **InfiniBand Subnet Details** window opens.
5. Click the **Ports** tab. [Table 8-27](#) lists and describes the fields on this tab.

Table 8-27: Ports Tab Fields

Field	Description
SubnetPrefix	The subnet prefix of the node.
NodeGUID	The global unique ID (GUID) of the node that includes the port.
Port	Local port number for this port.
LID	16-bit base LID of this port.

Table 8-27: Ports Tab Fields (Continued)

Field (Continued)	Description
State	State of the port: <ul style="list-style-type: none"> • noStateChange • sleep • polling • disabled • portConfigurationTraining • linkup • linkErrorRecovery • reserved
LinkWidthActive	Currently active link width, indicated as follows: <ul style="list-style-type: none"> • 1: 1x • 2: 4x • 8: 12x • 0, 3, 4-7, 9-255 reserved

Viewing Switches

To view the switches in the **Topology** view:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Click the **Details** button. The **InfiniBand Subnet Details** window opens.
5. Click the **Switches** tab. [Table 8-28](#) lists and describes the fields on this tab.

Table 8-28: Switches Tab Fields

Field	Description
SubnetPrefix	The subnet prefix of the node.
NodeGUID	The global unique ID (GUID) of the node that includes the switch.
LinearFdbCap	Number of entries supported in the Linear Unicast Forwarding table. Zero indicates that there is no Linear Forwarding Database.
RandomFdbCap	Number of entries supported in the Random Unicast Forwarding table. Zero indicates that there is no Random Forwarding Database.
McastFdbCap	Number of entries supported in the Multicast Forwarding table.
LinearFdbTop	Indicates the top of the Linear Forwarding Table. Packets received with unicast DLIDs greater than this value are discarded by the switch. This component applies only to switches that implement Linear Forwarding Tables and is ignored by switches that implement Random Forwarding Tables.
DefaultPort	Forward to this port all the unicast packets from the other ports whose DLID does not exist in the Random Forwarding Table.

Table 8-28: Switches Tab Fields (Continued)

Field	Description
DefPriMcastPort	Forward to this port all the multicast packets from the other ports whose DLID does not exist in the forwarding table.
DefNonPriMcastPort	Forward to this port all the multicast packets from the smDefPriMcastPort port whose DLID does not exist in the forwarding table.
LifeTimeValue	The time a packet can live in the switch.
PortStateChange	Identifies whether or not the port is in transition.
LIDPerPort	Number of LID/LMC combinations that may be assigned to a given external port for switches that support the random forwarding table.
PartitionEnfCap	The number of entries in this partition enforcement table per physical port. Zero indicates that partition enforcement is not supported by the switch.
InEnfCap	Indicates switch is capable of partition enforcement on received packets.
OutEnfCap	Indicates switch is capable of partition enforcement on transmitted packets.
InFilterRawPktCap	Indicates switch is capable of raw packet enforcement on received packets.
OutFilterRawPktCap	Indicates switch is capable of raw packet enforcement on transmitted packets.

Viewing Neighbors

To view the ports in the **Topology** view:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Click the **Details** button. The **InfiniBand Subnet Details** window opens.
5. Click the **Neighbors** tab. [Table 8-29](#) lists and describes the fields on this tab.

Table 8-29: Neighbors Tab Fields

Field	Description
SubnetPrefix	Used to identify IB subnet in which this IB node is located.
LocalNodeGuid	The global unique ID (GUID) of the IB node.
LocalPortId	Identifies the port ID of the IB node.
LocalNodeType	Identifies the IB node's node-type. <ul style="list-style-type: none"> • channelAdapter • switch
RemoteNodeGuid	The global unique ID (GUID) of the remote IB node.
RemotePortId	Identifies the port id of the remote IB node.
RemoteNodeType	Identifies the remote IB node's node-type. <ul style="list-style-type: none"> • channelAdapter • switch

Table 8-29: Neighbors Tab Fields (Continued)

Field	Description
LinkState	Used to identify the state of the link connecting the neighbors. <ul style="list-style-type: none"> noStateChange down initialize active
LinkWidthActive	Used to identify the width of the link connecting the neighbors.

Viewing Subnet Management Agents

You can view any of the following SMA details:

- Nodes
- Switches
- Switch Cap
- Ports (1)
- Ports (2)
- Mcast
- Linear Forwarding
- PKey
- SLVL Map

Nodes

To view SMA node details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMAs** button. The **Subnet Manager Agents** window opens.
6. Click the **Nodes** tab. [Table 8-30](#) lists and describes the fields on this tab.

Table 8-30: Nodes Tab Fields

Field	Description
Guid	Subnet prefix of this IB subnet.
BaseVersion	Supported base management datagram version.
ClassVersion	Supported subnet management class.
Type	Type of node being managed: <ul style="list-style-type: none"> channelAdapter switch
PortGuid	GUID of this port. One port within a node can return the nodeGUID as its PortGUID if the port is an integral part of the node and is not field-replaceable.

Table 8-30: Nodes Tab Fields (Continued)

Field	Description
PartitionCap	Number of entries in the partition table for channel adapter, router, and the switch management port. This is, at a minimum, set to 1 for all nodes including switch.
DeviceId	Device ID information as assigned by device manufacturer.
Revision	Device revision, assigned by manufacturer.
LocalPortNum	The link port number this SNMP packet came in on.
VendorId	Device vendor ID, per IEEE.
TrapBuffer	Special purpose string buffer for IB Trap Data.
String	Description of the node.
NumPorts	Number of physical ports on this node.

Switches

To view SMA switch details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the Topology View display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMAs** button. The **Subnet Manager Agents** window opens.
6. Click the **Switches** tab. [Table 8-31](#) lists and describes the fields on this tab.

Table 8-31: Switches Tab Fields

Field	Description
Guid	Global unique ID of the switch.
LftTop	Indicates the top of the Linear Forwarding Table. Packets received with unicast DLIDs greater than this value are discarded by the switch. This component applies only to switches that implement Linear Forwarding Tables and is ignored by switches that implement Random Forwarding Tables.
DefaultPort	Forward to this port all the unicast packets from the other ports whose DLID does not exist in the Random Forwarding Table.
DefMcastPriPort	Forward to this port all the multicast packets from the other ports whose DLID does not exist in the forwarding table.
DefMcastNPPort	Forward to this port all the multicast packets from the Default Primary port whose DLID does not exist in the forwarding table.
LifeTimeValue	Time a packet can live in the switch.
PortStateChange	It is set to one anytime the PortState component in the PortInfo of any ports transitions from Down to Initialize, Initialize to Down, Armed to Down, or Active to Down as a result of link state machine logic. Changes in Portstate resulting from SubnSet do no change this bit. This bit is cleared by writing one, writing zero is ignored.
LidsPerPort	Specifies the number of LID/LMC combinations that may be assigned to a given external port for switches that support the Random Forwarding Table.

Switch Cap

To view SMA switch cap details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMA**s button. The **Subnet Manager Agents** window opens.
6. Click the **Switch Cap.** tab. [Table 8-32](#) lists and describes the fields on this tab.

Table 8-32: Switch Cap Tab Fields

Field	Description
LftCap	Number of entries supported in the Linear Unicast Forwarding Table.
RftCap	Number of entries supported in the Random Unicast Forwarding Table. RandomFDBCap = 0 indicates that there is no Random Forwarding Database.
MftCap	Number of entries supported in the Multicast Forwarding Table.
PartitionEnfCap	Specifies the number of entries in the partition enforcement table per physical port. Zero indicates that partition enforcement is not supported by the switch.
InboundEnfCap	Indicates switch is capable of partition enforcement on received packets.
OutboundEnfCap	Indicates switch is capable of partition enforcement on transmitted packets.
FilterRawPktInCap	Indicates switch is capable of raw packet enforcement on received packets.
FilterRawPktOutCap	Indicates switch is capable of raw enforcement on transmitted packets.

Ports (1)

To view SMA port details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMA**s button. The **Subnet Manager Agents** window opens.
6. Click the **Ports (1)** tab. [Table 8-33](#) lists and describes the fields on this tab.

Table 8-33: Ports (1) Tab Fields

Field	Description
NodeGuid	64-bit GUID of the node that contains this port.
IbPort	The local port number of this port (relative to a particular node).
MKey	64-bit management Key for this port.
GidPrefix	64-bit global ID prefix for this port.

Table 8-33: Ports (1) Tab Fields (Continued)

Field	Description
Lid	16-bit base LID of this port.
MasterSMLid	16-bit base LID of the master SM that is managing this port.
CapabilityMask	Supported capabilities of this node: <ul style="list-style-type: none"> • 0: Reserved, will be zero • 1: IsSM • 2: IsNoticeSupported • 3: IsTrapSupported • 4: IsResetSupported • 5: IsAutomaticMigrationSupported • 6: IsSLMappingSupported • 7: IsMKeyNVRAM • 8: IsPKeyNVRAM • 9: IsLEDInfoSupported • 10: IsSMDisabled • 11-15: Reserved, will be zero • 16: IsConnectionManagerSupported • 17: IsSNMPTunnelingSupported • 18: Reserved, will be zero • 19: IsDeviceManagementSupported • 20: IsVendorClassSupported • 21-31: Reserved, will be zero
DiagCode	Port diagnostic code.
MKeyLeasePeriod	Timer value used to indicate how long the M_Key protection bits are to remain non-zero after a SubnSet (PortInfo) fails an M_Key check. The value of the timer indicates the number of seconds for the lease period.
LocalPortNum	Local port number.
LinkWidthEnabled	Enabled link width (1x, 4x, or 12x).
LinkWidthSupported	Supported link width.
LinkWidthActive	Currently active link width.
LinkSpeedSupported	Supported link speed (in Gbps).
State	State of the port: <ul style="list-style-type: none"> • noStateChange • down • initialize • armed • active

Table 8-33: Ports (1) Tab Fields (Continued)

Field	Description
PortPhys	State of the physical port: <ul style="list-style-type: none"> • noStateChange(0), • sleep • polling • disabled • portConfigurationTraining • linkup • linkErrorRecovery • reserved
MKeyProtectBits	Determines MADheader behavior.
LMC	LID mask for multipath support.
LSActive	Current active link speed.
LSActiveEnabled	Enabled link speed.
NeighborMTU	Active maximum MTU enabled on this port for transmit.
MasterSMSL	The administrative SL of the master SM that is managing this port.

Ports (2)

To view extended SMA port details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMA**s button. The **Subnet Manager Agents** window opens.
6. Click the **Ports (2)** tab. [Table 8-34](#) lists and describes the fields on this tab.

Table 8-34: Ports (2) Tab Fields

Field	Description
NodeGuid	64-bit GUID of the node that contains this port.
IbPort	The local port number of this port (relative to a particular node).
VLCap	Virtual lanes supported on this port.
VLHighLimit	Limit of high priority component of VL arbitration table.
VLArbitrationHighCap	VL/Weight pairs supported on this port in the smVLArbTable for high priority.
VLArbitrationLowCap	VL/Weight pairs supported on this port in the smVLArbTable for low priority.
MTUCap	Maximum MTU supported by this port.
VLStallCount	Specifies the number of sequential packets dropped that causes the port to enter the VLStalled state.
HOQLife	Time a packet can live at the head of a VL queue.

Table 8-34: Ports (2) Tab Fields (Continued)

Field	Description
OpVLs	Virtual Lanes operational on this port.
PkeyEnfln	Indicates support of optional partition enforcement on packets received from this port.
PkeyEnfOut	Indicates support of optional partition enforcement on packets transmitted from this port.
FilterRawPktIn	Indicates support of optional raw packet enforcement on raw packets received from this port.
FilterRawPktOut	Indicates support of optional raw packet enforcement on raw packets transmitted from this port.
MKeyViolations	Number of SMP packets that have been received on the port that have had invalid M_Key since poweron or reset.
PKeyViolations	Number of packets that have been received on the port that have had invalid P_Key since poweron or reset.
QKeyViolations	Number of packets that have been received on the port that have had invalid Q_Key since poweron or reset.
GuidCap	Number of GUID entries supported in the GUIDInfo attribute for this port.
SubnetTimeout	Maximum expected subnet propagation delay.
RespTimeValue	Expected maximum time between the port reception of an SMP and the transmission of the associated response.
LocalPhysErr	Threshold value. When the count of marginal link errors exceeds this threshold, the local link integrity error is detected.
OverrunErr	Overrun threshold value. When the count of buffer overruns exceeds the threshold, an excessive buffer overrun error occurs.

Mcast

To view SMA multicast details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMA**s button. The **Subnet Manager Agents** window opens.
6. Click the **Mcast** tab. [Table 8-35](#) lists and describes the fields on this tab.

Table 8-35: Mcast Tab Fields

Field	Description
NodeGuid	GUID of the node.
TableBlockIndex	Index into the multicast block table; this index starts from 1 rather than 0.
TableBlock	List of 32 PortMask Block Elements. 16 bits starting at position 16*p of the port mask associated with the particular LID. An incoming packet with this LID is forwarded to all ports for which the bit in the port mask is set to 1. Note that an invalid LID is indicated with an all zero PortMask.

Linear Forwarding

To view SMA Linear Forwarding Table details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMA**s button. The **Subnet Manager Agents** window opens.
6. Click the **Linear Forwarding** tab. [Table 8-36](#) lists and describes the fields on this tab.

Table 8-36: Linear Forwarding Tab Fields

Field	Description
NodeGuid	GUID of the node.
BlockIndex	Index into the Linear Forwarding Table; this index starts from 1 rather than 0.
Block	Linear Forwarding Table block.

PKey

To view SMA partition details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.
5. Click the **SMA**s button. The **Subnet Manager Agents** window opens.
6. Click the **PKey** tab. [Table 8-37](#) lists and describes the fields on this tab.

Table 8-37: PKey Tab Fields

Field	Description
NodeGuid	GUID of the node.
IbPort	Port number.
Index	PKEY table index.
TableVector	GUID assigned by the SM on the subnet.

SLVL Map

To view SMA SLVL details:

1. Click the **InfiniBand** menu and select **Topology View**. The **Specify Topspin Devices** dialog box opens.
2. (Optional) Click the checkbox, in the **Enabled** column, of any additional IB devices that you want to add to the **Topology View** display.
3. Click the **OK** button. The **InfiniBand Topology** window appears.
4. Double-click a server switch icon. The **Internal InfiniBand Topology** window opens.

- Click the **SMA**s button. The **Subnet Manager Agents** window opens.
- Click the **SLVL Map** tab. [Table 8-38](#) lists and describes the fields on this tab.

Table 8-38: SLVL Map Tab Fields

Field	Description
NodeGuid	GUID of the node.
InIbPort	Ingress port number.
OutIbPort	Egress port number.
SL#toVI	SL# to VL mapping.

Viewing Device Management

With Device Management, you can:

- View IOUs.
- View IOCs.
- View IOC Services.

Viewing IOUs

To view the I/O Units (IOUs) on your device:

- Click the **InfiniBand** menu and select **DM**. The **Device Manager** window opens.
- Click the **IOU** tab. [Table 8-39](#) lists and describes the fields on this tab.

Table 8-39: IOU Display Fields

Field	Description
Change ID	Cumulative number of changes to the controller list since the device last booted.
Max Controllers	Maximum number of controllers that your device can support.
Diag Device ID	All device IDs appear as 1 .
Option ROM	Indicates the presence or absence of Option ROM.
Controllers	Lists each slot on your device that can potentially contain a controller and identifies whether or not a controller resides in that slot.

Viewing IOCs

To view the I/O controllers (IOCs) on your device:

- Click the **InfiniBand** menu and select **DM**. The **Device Manager** window opens.
- Click the **IOC** tab. [Table 8-40](#) lists and describes the fields on this tab.

Table 8-40: IOCs Display Fields

Field	Description
GUID	GUID of the controller.
Vendor ID	Organization Unique Identifier (OUI) of the vendor.
Device ID	Vendor-assigned device identifier.
Device Version	Vendor-assigned device version.

Table 8-40: IOCs Display Fields (Continued)

Field	Description
Subsystem Vendor ID	Vendor-assigned subsystem vendor identifier.
Subsystem ID	Vendor-assigned subsystem identifier.
IOClass	I/O class that the IOC supports.
IOSubclass	Subclass of the I/O class protocol of the IOC.
Protocol	Standard protocol definition that the IOC supports.
Protocol Version	Protocol version that the IOC supports.
Send Msg Queue Depth	Maximum number of messages that the send message queue supports.
RDMA Read Queue Depth	Maximum depth of the per-channel RDMA Read Queue.
Send Msg Size	Maximum size, in bytes, of send messages.
RDMA transfer size	Maximum size, in bytes, of outbound RDMA transfers that the IOC initiates.
Controller Op Cap	Integer value (from 8 cumulative bits) between 1 and 255 that represents the operation type(s) that the IOC supports: <ul style="list-style-type: none"> • bit 0: ST—Send Messages To IOCs • bit 1: SF—Send Messages From IOCs • bit 2: RT—RDMA Read Requests To IOCs • bit 3: RF—RDMA Read Requests From IOCs • bit 4: WT—RDMA Write Requests To IOCs • bit 5: WF—RDMA Write Requests From IOCs • bit 6: AT—Atomic Operations To IOCs • bit 7: AF—Atomic Operations From IOCs
Service Entries	Number of services that the IOC provides.

Viewing IOC Services

To view the IOC services on your device:

1. Click the **InfiniBand** menu and select **DM**. The **Device Manager** window opens.
2. Click the **IOC Services** tab. A table of IOC Services details appears. [Table 8-41](#) lists and describes the fields in this table.

Table 8-41: IOC Services Table Fields

Field	Description
IOC GUID	GUID of the node that provides the service.
Service Name	ASCII identifier of the service.
Service ID	Numeric identifier that nodes use to call the service.

Help Menu Tasks

The following sections appear in this chapter:

- [“Introduction” on page 103](#)
- [“Launching On-Line Help” on page 103](#)
- [“Launching the Support Web Site” on page 103](#)
- [“Viewing the Element Manager Status Legend” on page 104](#)

Introduction

The tasks under the **Help** menu provide EM resources and Support resources. For context-sensitive on-line help, click the **Help** button in any EM window.

Launching On-Line Help

To launch on-line help, click the **Help** menu and select **Contents**.

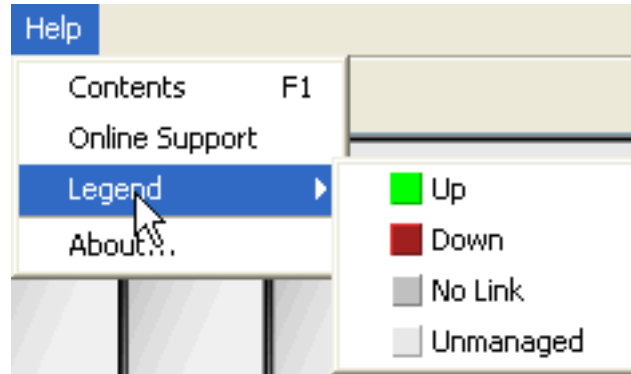
Launching the Support Web Site

To launch the support Web site, click the **Help** menu and select **Online Support**.

Viewing the Element Manager Status Legend

To view the EM status legend, click the **Help** menu and select **Legend**.

Example



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