InfiniBand Menu Tasks

This chapter describes the InfiniBand menu tasks for Element Manager and contains these sections:

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- Viewing Subnet Manager Properties, page 8-8
- Viewing Database Synchronization Details, page 8-14
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Note This section provides information to familiarize you with the InfiniBand technology. For hardware-specific information, consult the relevant hardware documentation.

Understanding InfiniBand

InfiniBand is a high speed, high density serial interconnect that increases CPU utilization, decreases latency, and eases the management problems 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.

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

InfiniBand Components

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

- InfiniBand switch—Passes traffic between InfiniBand-capable devices over the InfiniBand network
- Host channel adapters (installed in host)—Serves as an InfiniBand version of a network interface card (NIC) to connect the host to the InfiniBand network
- Ethernet gateway—Provides Ethernet connectivity to an InfiniBand network
- Fibre Channel gateway—Provides Fibre Channel connectivity to an InfiniBand network

Protocols

InfiniBand requires a new set of protocols. All of the necessary protocol drivers are included with the Server Switch.

IPoIB

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

You can use the IPoIB driver to perform an address resolution and manage the multicast membership.

SDP

The Sockets Direct Protocol (SDP) is a transparent protocol used on InfiniBand networks to allow sockets-based applications to take advantage of the RDMA performance over an InfiniBand network. SDP reduces the amount of software running inside a process context. The zero-copy SDP 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

The SCSI RDMA Protocol (SRP) is an upper-layer storage protocol for InfiniBand that runs SCSI commands across RDMA-capable networks for InfiniBand hosts to communicate with Fibre Channel storage devices. This protocol allows InfiniBand hosts to natively send SCSI commands as if the storage was directly attached.

The SRP protocol uses an RDMA communication service that provides communication between pairs of consumers; it uses messages for control information and RDMA operations for data transfers.

The SRP protocol is used only if you have a Fibre Channel Gateway installed in your InfiniBand system.

uDAPL

The user Direct Access Programming Library (uDAPL) is a standardized user mode API that natively supports InfiniBand fabrics. uDAPL performs name-to-address translations, establishes connections, and transfers data reliably. The primary responsibilities of uDAPL are: connection management and low latency data transfer and completion

Architectural Elements

The following structures serve as foundational elements of InfiniBand architecture:

- RDMA, page 8-3
- Queue Pairs, page 8-4
- Services

RDMA

InfiniBand uses RDMA technology. RDMA allows one computer to place information directly into the memory of another computer. RDMA allows user space applications to directly access hardware and 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. This feature results in lower CPU utilization per I/O operation and more efficient use of machine resources because applications place most of the messaging burden upon InfiniBand's high-speed network hardware.

Queue Pairs

The queue pair (QP) is one of the primary architectural elements of InfiniBand. In InfiniBand, communication occurs between queue pairs, instead of between ports.

A queue pair is an addressable entity that consists of two work queues: a Send work queue and a Receive work queue. The Channel Adapter hardware arbitrates communication by multiplexing access to the send queue or demultiplexing messages on the receive queue.

Note A verb 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 provides a consumer with the ability to queue up a set of instructions that are executed by the Channel Adapter. There are two types of work queues: Send work queues (outbound) and a receive work queues (inbound). Together these work queues create a queue pair.

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

Send and receive work queues have these characteristics:

- Always created as a pair
- Always remain a pair
- Known as QPs
- Identified by a queue pair number, which is within the Channel Adapter.

Queue pairs have:

- A region of memory to be used as buffers (numbers of queue pairs 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 queue pair may access.

The queue pair is the mechanism by which you define quality of service, system protection, error detection and response, and allowable services.

Each queue pair is independently configured for a particular type of service. These service types provide different levels of service and different error-recovery characteristics as follows:

- Reliable connection
- Unreliable connection
- Reliable datagram
- Unreliable datagram

Once the fabric connections are discovered, queue pairs and protection domains are established, the type and quality of service are defined for each queue pair, and the fabric operates reliably and securely at full QoS without impacting system hardware or software resources.

Understanding the Subnet Manager

The Subnet Manager configures and maintains fabric operations. There can be multiple Subnet Managers, but only one master. The Subnet Manager is the central repository of all information that is required to set up and bring up the InfiniBand fabric.

The master Subnet Manager does the following:

- Discovers the fabric topology.
- Discovers end nodes.
- Configures switches and end nodes with their parameters, such as the following:
  - 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 Manager Agents are part of the Subnet Manager. A Subnet Manager Agent is provided with each node and process packets from the Subnet Manager.

If a Subnet Manager is elected master, all of its components, including Subnet Agent, are implicitly elected master. If a Subnet Manager ceases to be the master, all of its components cease responding to messages from clients.

Subnet Manager Hot Standby

The master and slave Subnet Managers can be synchronized so that the information in the master is carried over to the slave if a fail-over occurs. See the "Enabling Subnet Manager Database Synchronization" section on page 8-33 to configure the hot-standby Subnet Manager.

The hot standby/database synchronization feature is used to synchronize the databases between Subnet Managers running on separate chassis.

The Subnet Manager maintains a database in the volatile memory of the master Subnet Manager. Database synchronization is accomplished in two stages:

- Cold Synchronization—This stage is initiated by the master Subnet Manager when it is ready to start a synchronization session with a standby Subnet Manager. In this stage, tables that are not synchronized are copied from the master Subnet Manager to the standby Subnet Manager.
- Transactional Synchronization—This stage is entered following the 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 Subnet Manager.

A standby Subnet Manager can become the master in any of these situations:

- The node that is running the current master Subnet Manager crashes.
- Partitioning of the subnet (such as due to a link failure) takes place.
- Graceful shutdown of the master (such as for maintenance purposes) takes place.

The following occurs in the event of a failure:

- The standby Subnet Manager becomes the new master.
- The new master rebuilds the database from information retrieved during the subnet discovery phase.
- Existing LID assignments are retained, where possible.
- All ports are reset to force them to rejoin multicast groups, advertise the services again, request event forwarding again, and reestablish connections.
- 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 InfiniBand routing:

- Routing internally within a switch (hops between switch chips)
- Routing between whole switches (hops between nodes)

Note This process is 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 is as follows:

Step 1 The Subnet Manager discovers all the InfiniBand switch chips in the network.

Step 2 The Subnet Manager groups the internal switch chips within each chassis into a switch element.

Step 3 The Subnet Manager process continues until all the InfiniBand switches are grouped into switch elements.

Step 4 After all the switch chips are grouped, the Subnet Manager routes the switch elements according to the routing algorithm discussed in the "Minimum Contention, Shortest Path, and Load Balancing Algorithm" section on page 8-7.

Step 5 The internal network of each InfiniBand switch is then routed based on the best algorithm for each switch element.

Multiple Paths

The Subnet Manager allows you to define the Local Identifier Mask Control (LMC) value per subnet. The default value of the LMC is 0. By default, only one Local Identifier (LID) is assigned to each host port.

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

Understanding Subnet Manager Routing Terms

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

- Tolerance is used when deciding if a particular path is better in distance than the already selected path. You can choose the tolerance to be used for the shortest path calculation as follows:
  - If the tolerance is set to 0, a pair of distinct paths to an endport are said to be of equal distance if the number of hops in the paths is the same.
  - If the tolerance is set to 1,a pair of distinct paths to an endport are said to be of equal distance if the difference in their hop count is less than or equal to one.
- 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, and Load Balancing Algorithm

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

The following process shows how the algorithm makes the calculation:

Step 1 The shortest path for each of the host ports is calculated.

Step 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 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.

Currently, only the internal routing for the Cisco SFS 7008 (a 96-port switch) supports this routing scheme. See the Cisco SFS 7008 Hardware Guide, or contact technical support for more information.

Configuring Your Network For Optimal Routing

For optimal routing, we recommend that you follow these steps:

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

We recommend that InfiniBand switch elements be connected so that all paths between any pair of switch elements are the same distance (same number of hops), if possible. This process enables you to obtain the optimal paths using the default tolerance of 0. If the paths have different lengths, then the tolerance value will need to be determined.

The Subnet Manager 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. 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 Subnet Manager properties, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Manager window opens.

Step 2 Select a subnet.

A table of Subnet Manager properties appears under the **General** tab. Table 8-1 describes the fields.

Table 8-1 Subnet Manager Properties Window Fields

Field	Description
GUID	Displays the GUID of the port on which the Subnet Manager runs.
Status	Status of the Subnet Manager. It may appear as master, standby, inactive, or discovery.
Activity Count	Activity counter that increments each time that the Subnet Manager issues a subnet management packet (SMP) or that performs other management activities.
SM Key	64-bit subnet management key assigned to a Subnet Manager.
Priority	Priority of the Subnet Manager relative to other Subnet Managers in the InfiniBand network. Priority is assigned to the higher number.
Sweep Interval	Specifies how frequently a Subnet Manager queries the InfiniBand fabric for network changes.
Response Timeout	Maximum amount of time that the Subnet Manager waits for a response after it sends a packet to a port. If the Subnet Manager does not receive a response in time, the Subnet Manager identifies the port as unresponsive.
Master Poll Interval	Interval at which a slave Subnet Manager polls a master to see if it still runs.
Master Poll Retries	Number of unanswered polls that cause a slave to identify a master as dead.

Table 8-1 Subnet Manager Properties Window Fields (continued)

Field	Description
Max Active SMs	Maximum number of standby Subnet Managers that a master supports. A value of 0 indicates unlimited Subnet Managers.
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.
Switch Life Time	The lifetime of a packet inside a Server Switch. This value defaults to 20.
Switch Link HoQ Life	The lifetime of a packet at the head of queue of a switch port. This value defaults to 20.
CA Link HoQ Life	The lifetime of a packet at the head of queue of the host port. This value defaults to 20. **Note** Element Manager does not currently support this field.
Maximum Hop Count	Specifies the maximum hops.
MAD Retries	Number of times that a Subnet Manager resends a MAD after not receiving a response. The default value is 5.
Node Timeout	Minimum amount of time in seconds that a HCA my be unresponsive before the Subnet Manager removes it from the InfiniBand fabric. The default value is 10 seconds.
Wait Report Response	Whether or not a Subnet Manager waits to receive ReportResponse MADs in response to the Report MAD that it forwards. If this Boolean value is set to false, the Subnet Manager only sends the Report MADs once; if set to true, the Subnet Manager will continue to send the Report MADs until either the Report Response MAD is received or the maximum number of Report MADs have been sent. The default value is false.
SA MAD Queue Depth	Size of a Subnet Agent internal queue for receiving MADs. The default value is 256.

Configuring Subnet Manager Priority

To configure Subnet Manager priority, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Select the value in the Priority column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring a Subnet Manager Sweep Interval

To configure a Subnet Manager sweep interval, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Select the value in the Sweep Interval column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring a Subnet Manager Response Timeout

To configure Subnet Manager response timeout, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Response Timeout column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring a Subnet Manager Master Poll Interval

To configure the interval at which the switch polls the master switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Master Poll Interval column and replace the value.

Step 4 Click **Apply**.

Configuring Subnet Manager Master Poll Retries

To configure the number of Subnet Manager master poll retries, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Master Poll Retries column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring the Maximum Number of Active Subnet Managers

To configure the maximum number of active Subnet Managers on the InfiniBand network, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Max Active SMs column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring the LID Mask Control

To configure the local ID mask control, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the LID Mask Control column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring Switch Lifetime

To configure the switch lifetime, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Switch Life Time column and replace it with the value that you want to apply.

Step 4 Click **Apply**.

Configuring Switch Link HoQ Life

To configure the switch link head of queue (HoQ) life, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Switch Link HoQ Life column and replace the value.

Step 4 Click **Apply**.

Configuring CA Link HoQ Life

To configure the collision allowance (CA) link for head of queue (HoQ) life, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the CA Link HoQ Life column and replace the value.

Step 4 Click **Apply**.

Configuring Maximum Hop Count

We recommend that InfiniBand switch elements be connected so that all paths between any pair of switch elements are the same distance (same number of hops), if possible. To configure the maximum hop count, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Maximum Hop Count column and replace the value.

Step 4 Click **Apply**.

Configuring MAD Retries

To configure MAD retries, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the MAD retries column and replace the value.

Step 4 Click **Apply**.

Configuring Node Timeout

To configure the node timeout, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Node Timeout column and replace the value.

Step 4 Click **Apply**.

Configuring Wait Report Response

To configure the wait report response, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Wait Report Response column and replace the value.

Step 4 Click **Apply**.

Configuring Subnet Agent MAD Queue Depth

To configure Subnet Agent MAD queue depth, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the Subnet Manager tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the SA MAD Queue Depth column and replace the value.

Step 4 Click **Apply**.

Viewing Database Synchronization Details

Element Manager provides multiple screens that you can use to configure database synchronization. Configuration details and field descriptions are in the "Configuring Database Synchronization" section on page 8-32.

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Manager window opens.

Step 2 Click the **Database Sync** tab.

Details appear in the table below the tab.

Note Database synchronization is enabled by default.

Understanding Partitions

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

- Increase security.
- Divide a large cluster into small isolated subclusters.
- Map InfiniBand nodes to selected VLANs.

Note If db-sync is enabled, changes to partition configuration are only allowed on the chassis running the master subnet manager. For more information, see the "Configuring Database Synchronization" section on page 8-32.

How Partitions Work

A partition defines a set of InfiniBand 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 Subnet Manager 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 Subnet Manager's configuration. Packets with invalid P_Keys are discarded. P_Key validation prevents a server from communicating with another server outside of its partition.

InfiniBand 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 does not 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 you can define overlapping partitions as the situation requires.

At the time a port member is added to the partition, you 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, 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 and 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 Subnet Manager 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

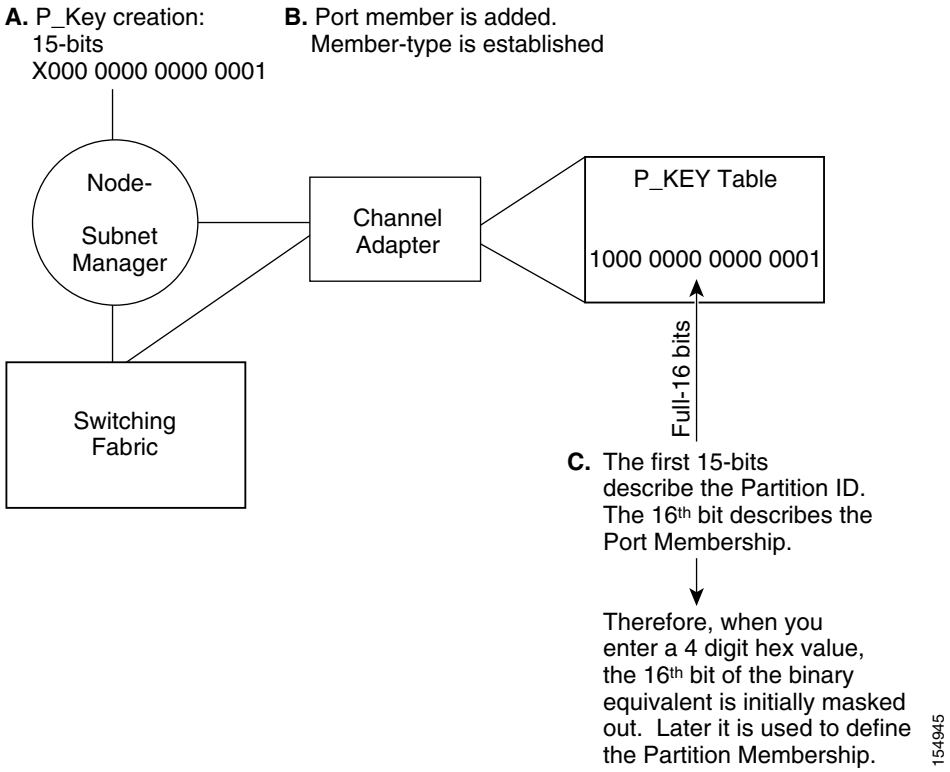
For a list of acceptable P_Key values, see Table 8-3 on page 8-18.

Upon creation, the p_key value (see Figure 8-1) 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:

Do not create two p_keys because they will be viewed as the same number by the system. For example, if you created 0 #:# # and 8#:# #, the system would view them as the same number.

Figure 8-1 Partition Keys



Hexadecimal to Binary Conversions

Table 8-2 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
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 choose your values from the list in Table 8-3.

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 by the master Subnet Manager. If db-sync is enabled, the master Subnet Manager synchronizes P_key information to standby Subnet Managers (currently, only one standby manager is allowed). A synchronized standby retains the information from the master.

If you configure only one InfiniBand switch, it is automatically the master, and the partition configuration is saved persistently on the switch. See the "Enabling Subnet Manager Database Synchronization" section on page 8-33 for details.

Viewing Partition Details

To view the attributes of the partitions on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Partitions** tab.

Details appear in the table below the tab. Table 8-4 describes the fields in the table.

Table 8-4 Partition Field Descriptions

Field	Description
SubnetPrefix	Subnet prefix of the subnet with partitions that you want to view.
Key	Partition key of the partition with members that the display prints.
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	Time stamp for when the partition table was last changed.

Note A more user friendly view of the information appears if you select **Subnet Management** in step 1.

Configuring Multicast Groups

To configure multicast groups, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Manager window opens.

Step 2 Expand a subnet.

Step 3 Select **Multicast Groups**.

Step 4 Click **Add**.

Step 5 Select **MGID** from the drop-down list.

Step 6 Enter an MGID in the Multicast Group ID field.

Step 7 (Optional) Enter a queue key in the QKey field.

Step 8 Select a value in the MTU field to configure the maximum transmission unit of the group.

Step 9 Enter a partition key in the PKey field.

Step 10 Select a rate in the Rate field.

Step 11 Enter an integer value (between 0 and 15) in the Service Level field.

Step 12 Select a scope value in the Scope field.

Step 13 Click **Add**.

Note The TClass, Packet Lifetime, Flow Label, and Hop Limit attributes are not supported in this release.

Configuring IPoIB Broadcast Multicast Groups

To configure IPoIB broadcast multicast groups, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Manager window opens.

Expand a subnet.

Step 2 Select **Multicast Groups**.

Step 3 Click **Add**.

Step 4 Choose **IPoIB** from the drop-down list.

Step 5 Enter an MGID in the Multicast Group ID field.

Step 6 (Optional) Enter a queue key in the QKey field.

Step 7 Select an MTU value from the drop-down list.

Step 8 Enter a partition key in the PKey field.

Step 9 Select a data rate from the Rate field.

Step 10 Enter an integer value (between 0 and 15) in the Service Level field.

Step 11 Choose a scope value in the Scope field.

Step 12 Click **Add**.

Note The TClass, Packet Lifetime, Flow Label, and Hop Limit attributes are not included in this release.

Viewing Multicast Group Details

To view the attributes of the multicast groups on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Expand a subnet.

Step 2 Expand **Multicast Groups**.

You see the multicast information in the right pane. Table 8-5 describes the fields.

Table 8-5 Multicast Group Field Descriptions

Field	Description
SubnetPrefix	Subnet prefix of the Subnet Manager.
MGID	128-bit multicast GID address for this multicast group.
QKey	16-bit Q-Key of this multicast group.
MLID	16-bit LID of this multicast group.
MTU	Maximum transmission unit
PKey	16-bit Partition Key for this multicast group.
Rate	Traffic rate of this multicast group.
SL	Service level of this multicast group.
Scope	Scope of this multicast group.
UserConfigured	Displays true if a user configured the entry; otherwise displays false.

Note A more user friendly view of the information appears if you choose **Subnet Management** in step 1.

Viewing Multicast Member Details

To view the details of the multicast members on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Multicast Member** tab.

Details appear in the table below the tab. Table 8-5 describes the fields in the table.

Table 8-6 Multicast Member Field Descriptions

Field	Description
SubnetPrefix	Subnet prefix of this InfiniBand subnet.
MGID	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	Time stamp when the multicast member table was last changed.

Note A more user friendly view of the information appears if you choose **Subnet Management** in step 1.

Viewing InfiniBand Services

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

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Manager window opens.

Step 2 Click the **Services** tab.

Details appear in the table below the tab. Table 8-7 describes the fields in the Subnet Managers table.

Table 8-7 Services Table Fields

Field	Description
Service Name	Name of the subnet service.
Service ID	Unique identifier that the Subnet Manager assigns to the service.
Service GID	Services that use the same GID as the InfiniBand controller (node) on which they run.
Service 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 that the lease is indefinite.
Key	64-bit service key.
Data (8 bit)	8-bit data associated with this service.
Data (16 bit)	16-bit data associated with this service.
Data (32 bit)	32-bit data associated with this service.
Data (64 bit)	64-bit data associated with this service.

Viewing Switch Route Details

Switch routes represent the complete path that traffic takes through the InfiniBand fabric from the source LID to the destination LID. To view the details of the switch routes on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **SwitchRoute** tab.

Details appear in the table below the tab. Table 8-8 describes the fields in the table.

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.

Note A more user friendly view of the information appears if you choose **Subnet Management** in step 1.

Viewing Switch Route Element Details

To view the details of the switch element routes on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **SwitchElementRoute** tab.

Details appear in the table below the tab. Table 8-9 describes the fields in the table.

Table 8-9 Switch Element Route Fields

Field	Description
SubnetPrefix	Subnet prefix of this InfiniBand 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.

Note A more user friendly view of the information appears if you choose **Subnet Management** in step 1.

Adding a Subnet Manager

To add a Subnet Manager to your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 In the navigation pane, click **Subnet Managers**.

The Subnet Managers display appears in the right pane of the window.

Step 3 Click **Add**.

The Add Subnet Manager window opens.

Step 4 Enter a **subnet** prefix in the Subnet Prefix field.

Step 5 Enter a **subnet** priority level in the Priority field.

Step 6 (Optional) Enter a **subnet** management key in the smKey field.

Step 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.

Step 8 Click **Add**.

The new Subnet Manager appears in the Summary table in the Subnet Managers display.

Removing a Subnet Manager

To remove a Subnet Manager from your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 In the navigation pane, click **Subnet Managers**.

The Subnet Managers display appears in the right pane of the window.

Step 3 In the Summary table in the Subnet Managers display, click the Subnet Manager that you want to remove.

Step 4 Click **Remove**.

The entry disappears from the display and the Server Switch configuration.

Configuring Subnet Manager Properties

The Subnet Managers navigation menu provides tuning for a number of system-wide attributes. The sections that follow explain each attribute and describe how to configure it.

Configuring Subnet Manager Priority

Every Subnet Manager in the InfiniBand network carries a priority value, and at any given time the Subnet Manager with the highest integer value priority becomes the master Subnet Manager. To configure the Subnet Manager priority on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Priority field.

The integer value 1 has the highest the priority.

Step 4 Click **Apply**.

Configuring the Sweep Interval

The sweep interval specifies how frequently the Subnet Manager queries the InfiniBand fabric for network changes. To configure the sweep interval on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Sweep Interval field.

This interval represents the number of seconds between sweeps.

Step 4 Click **Apply**.

Configuring Response Timeout

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

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Response Timeout field.

The Subnet Manager measures the response timeout in milliseconds.

Step 4 Click **Apply**.

Configuring the Master Poll Interval

The master poll interval determines the interval at which the slave Subnet Manager polls the master to see if the master still runs. To configure the master poll interval, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Master Poll Interval field.

The value represents the interval, in seconds.

Step 4 Click **Apply**.

Configuring the Number of Master Poll Retries

Master poll retries specifies the number of unanswered polls that cause a slave to identify a master as dead. To specify this value, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Master Poll Retries field.

Step 4 Click **Apply**.

Configuring the Maximum Number of Active Standby Subnet Managers that the Master Subnet Manager Supports

Note To configure an unlimited number of active standby (slave) Subnet Managers, enter a value of 0. However, the limit set here is not enforced in this release.

To configure the maximum number of active standby Subnet Managers that the master Subnet Manager supports, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Max active SMs field.

Step 4 Click **Apply**.

Configuring LID Mask Control

Local ID 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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the LID Mask Control field.

Step 4 Click **Apply**.

Configuring Switch Lifetime

Switch lifetime is one parameter that governs the transmitter packet discard policy of switches in the subnet. It determines the lifetime of packets in a switch from the point of ingress to egress. If this parameter is set to 20 or greater, then switch lifetimes are infinite (default). See InfiniBand Architecture Release 1.2, Volume 1 for more information.

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Switch Life Time field.

Step 4 Click **Apply**.

Configuring Switch Link HoQ Life

Switch link head of queue life determines how long an InfiniBand packet lives at the head of a switch port VL queue before it is discarded. If this parameter is set to 20 or greater, then HoQ lifetimes are infinite (default). See InfiniBand Architecture Release 1.2, Volume 1 for more information.

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Select the Subnet Manager that you want to configure.

Step 3 Enter an integer value in the Switch Link HoQ Life field.

Step 4 Click **Apply**.

Configuring Maximum Hop Count

To configure the maximum number of hops for an InfiniBand Subnet Manager, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.
The Subnet Manager window opens.

Step 2 Click the Subnet Manager that you want to configure.
Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Enter an integer value in the Maximum Hop Count field.

Step 4 Click **Apply**.

Configuring MAD Retries

To configure MAD retries, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.
The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.
A table of Subnet Manager properties appears.

Step 3 Highlight the value in the MAD retries column and replace the value.

Step 4 Click **Apply**.

Configuring Node Timeout

To configure the node timeout, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.
The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.
A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Node Timeout column and replace the value.

Step 4 Click **Apply**.

Configuring Wait Report Response

To configure the wait report response, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the Wait Report Response column and replace the value.

Step 4 Click **Apply**.

Configuring Subnet Agent MAD Queue Depth

To configure the Subnet Agent MAD queue depth, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management (tabular format)**.

The Subnet Manager window opens.

Step 2 Click the **Subnet Manager** tab.

A table of Subnet Manager properties appears.

Step 3 Highlight the value in the SA MAD Queue Depth column and replace the value.

Step 4 Click **Apply**.

Configuring Database Synchronization

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

Enabling Subnet Manager Database Synchronization

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

Note This features is enabled by default.

To enable Subnet Manager database synchronization to update standby Subnet Managers with information from the master Subnet Manager, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Check the **Enable** check box in the SM Database Synchronization field.

Step 5 Click **Apply**.

Configuring the Maximum Number of Backup Subnet Managers to Synchronize

To configure the maximum number of backup Subnet Managers that will synchronize with the master Subnet Manager, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the Max Backup SMs field.

Step 5 Click **Apply**.

Configuring a Session Timeout

To configure the session timeout interval, in seconds, during which a synchronization session status MAD packet must arrive at the master Subnet Manager to maintain synchronization, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the Session Timeout field.

This value determines the timeout duration, in seconds.

Step 5 Click **Apply**.

Configuring the Poll Interval

To configure the interval, in seconds, at which the master Subnet Manager polls an active slave Subnet Manager to verify synchronization, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

Step 2 The Subnet Management window opens.

Step 3 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 4 Click the **Database Sync** tab in the right pane of the display.

Step 5 Enter an integer value in the Poll Interval field.

This value sets the poll interval, in seconds.

Step 6 Click **Apply**.

Configuring the Cold Synchronization Timeout Value

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

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the **Cold Sync Timeout** field.

This value sets the timeout interval, in seconds.

Step 5 Click **Apply**.

Configuring the Cold Synchronization Limit Value

To configure the maximum number of cold synchronizations to perform during a given cold synchronization period, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the Cold Sync Limit field.

This value sets the maximum number of synchronizations that can occur during the synchronization period ("Configuring the Cold Synchronization Limit Period" section on page 8-36).

Step 5 Click **Apply**.

Configuring the Cold Synchronization Limit Period

To specify the length of the interval during which cold synchronizations may occur, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the Cold Sync Limit Period field.

This value sets the length of the interval during which cold synchronizations may occur.

Step 5 Click **Apply**.

Configuring the New Session Delay

To configure the amount of time that the master Subnet Manager waits before it attempts to initiate a synchronization session with a new Subnet Manager, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the New Session Delay field.

This value determines the amount of time, in seconds, that the master Subnet Manager waits before it attempts to initiate a synchronization session with a new Subnet Manager.

Step 5 Click **Apply**.

Configuring the Resynchronization Interval

To specify the interval at which the master Subnet Manager sends a resynchronization request to all active synchronization sessions, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Click the Subnet Manager that you want to configure.

Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Enter an integer value in the **Resync Interval** field.

This value specifies the interval, in seconds, at which the master Subnet Manager sends a resynchronization request to all active synchronization sessions.

Step 5 Click **Apply**.

Viewing the Database Synchronization State

To view the database synchronization state and verify that the master Subnet Manager and slave Subnet Manager(s) are synchronized, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens. Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

Step 2 Select the Subnet Manager that you want to configure.

Step 3 Click the **Database Sync** tab in the right pane of the display.

Step 4 Look at the **State** field.

Viewing Nodes

To view Subnet Manager node information, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens. Each Subnet Manager appears in the navigation pane with a Subnet Manager icon ( ).

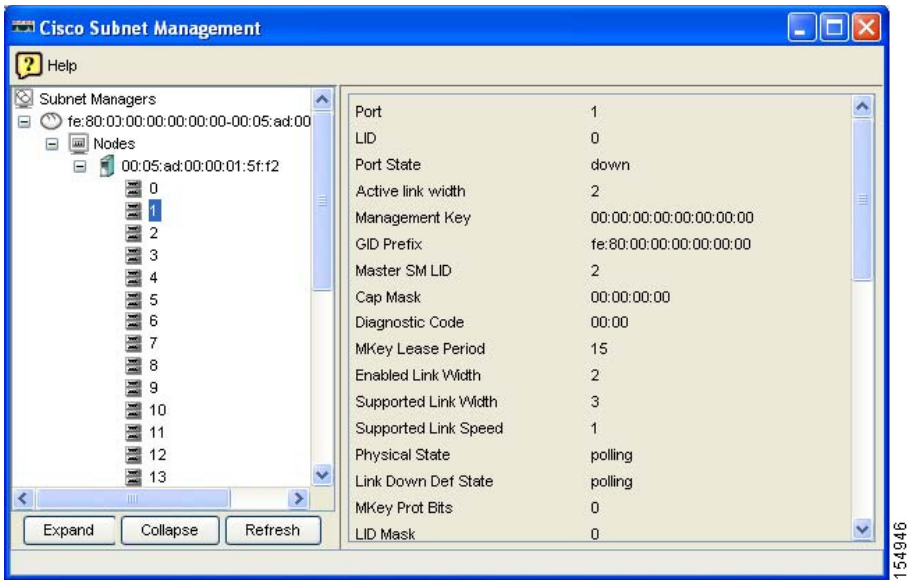
Step 2 Expand the Subnet Manager that you want to view.

Step 3 Expand **Nodes.**

The **Nodes in Subnet** tab displays the Node GUID, Type, Description, Number of Ports, System Image GUID, and the Vendor ID information.

Step 4 Expand a computer icon and select an individual node to see the information shown in Figure 8-2.

Figure 8-2 Individual Node Information



Viewing Partitions

To view the partitions on your InfiniBand network, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

The navigation menu expands.

Step 3 Click the **Partitions** ( ) branch.

The partitions summary appears in the right pane. Table 8-10 describes the fields in this display.

Table 8-10 Partitions Summary Field Descriptions

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 InfiniBand partition, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

Step 3 Select the **Partitions** ( ) branch.

Step 4 Click **Add**.

The **Add Partition** window opens.

Step 5 Enter a partition key for the new partition in the PKey field, and then click **Add**.

Removing a Partition

To delete a partition, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

Step 3 Expand the **Partitions** ( ) branch.

Step 4 Click the partition in the Summary display that you want to remove, and then click **Remove**.

Viewing Partition Details

To view partition details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

Step 3 Expand the **Partitions** ( ) branch to display all partitions.

Step 4 Click the partition key of the partition with details that 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 **Show Switch Mgmt Ports**. Click **Hide Switch Mgmt Ports** 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 a Partition

To add available members to a partition, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

Step 3 Expand the **Partitions** ( ) branch to display all partitions in the navigation menu.

Step 4 Select 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.

Step 5 Click the port in the Available Members field, that you want to add to the partition, and then click the right arrow next to the Full Members field.

Adding Unavailable Members to a Partition

To add unavailable members (members that do not appear in the Available Members pool) to a partition, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

Step 3 Expand the Partitions ( ) branch to display all partitions in the navigation menu.

Step 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.

Step 5 Click **Add Other**.

The Add Other Partition Member window opens.

Step 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.

Step 7 Specify the port(s) that you want to add to the partition in the Port field.

Step 8 Choose the **Full** radio button, and then click **Add**.

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 Limited Members

To add available limited members to a partition, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

The navigation menu expands.

Step 3 Expand the **Partitions** ( ) branch to display all partitions in the navigation menu.

Step 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.

Step 5 Click the port in the Available Members field, that you want to add to the partition and then click the right arrow next to the Limited Members field.

Adding Unavailable Members

To add an unavailable member (member does not appear in the Available Members pool) to a partition, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

Step 3 Expand the **Partitions** ( ) branch to display all partitions in the navigation menu.

Step 4 Select 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.

Step 5 Click **Add Other**.

The Add Other Partition Member window opens.

Step 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.

Step 7 Specify the port(s) that you want to add to the partition in the Port field.

Step 8 Choose the **Limited** radio button, and then click **Add**.

Viewing Multicast Groups

To view the multicast groups on your InfiniBand network, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with partitions that you want to view.

The navigation menu expands.

Step 3 Select the **Multicast Groups** ( ) branch.

The multicast groups summary appears in the right pane. Table 8-11 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 InfiniBand fabric.
QKey	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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with multicast groups that you want to view.

The navigation menu expands.

Step 3 Expand the **Multicast Groups** ( ) branch to display all groups in the navigation menu.

Step 4 Click the MGID of the multicast group with details that you want to view, and then click the **General** tab.

Multicast group details appear in the display. Table 8-12 describes the fields in this display.

Table 8-12 Multicast Group General Details Field Descriptions

Field	Description
QKey	16-bit Q-Key of this multicast group.
MLID	16-bit LID of this multicast group
MTU	Maximum transmission unit of the multicast group.
TClass	Tclass to be used in the GRH if GRH is used.
PKey	Partition key of the multicast group.

Table 8-12 Multicast Group General Details Field Descriptions (continued)

Field	Description
Rate	Traffic rate of this multicast group.
Packet Life Time	Packet lifetime 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.
User Configured	Displays true if a user configured the entry; otherwise displays false.

Viewing Multicast Group Members

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with multicast groups that you want to view.

The navigation menu expands.

Step 3 Expand the **Multicast Groups** ( ) branch to display all groups in the navigation menu.

Step 4 Click the MGID of the multicast group with details that you want to view, and then click the **Members** tab.

Multicast group members appear in the display. Table 8-13 describes the fields in this display.

Table 8-13 Multicast Group Members Field Descriptions

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 InfiniBand services that run on your Server Switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with services that you want to view.

Step 3 Click the **Services** ( ) branch.

Details of InfiniBand services appear in the right pane.

Table 8-14 describes the fields in the Summary section of the display.

Table 8-14 Services Summary Field Descriptions

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	16-bit multicast GID address.

Table 8-15 describes the fields in the Services Details section of the display.

Table 8-15 Services Details Field Descriptions

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 that the lease is indefinite.
Key	128-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 route between a pair of LIDs in the InfiniBand fabric. follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with services that you want to view.

Step 3 Select the **Routes** ( ) branch.

InfiniBand routes fields appear in the right pane.

Step 4 Enter the source LID of the route in the Source LID field.

Step 5 Enter the destination lid of the route in the Destination LID field.

Step 6 Click **Show Route**.

Step 7 Click the **Switch Route** tab.

Table 8-16 lists the fields under the Switch Route tab.

Table 8-16 Switch Route Field Descriptions

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

Step 8 Click the **Switch Element Route** tab.

Table 8-17 displays the fields under the Switch Element Route tab.

Table 8-17 Switch Element Route Field Descriptions

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

Viewing Subnet Managers Information

To view information on other Subnet Managers in the network, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with services that you want to view.

The navigation menu expands.

Step 3 Expand **Subnet Managers Info**.

The Port GUID, Priority, and Subnet Manager state information appears in the right pane.

Table 8-18 describes the fields in the Details pane.

Table 8-18 Subnet Managers Information Details Pane

Field	Description
Port GUID	Displays the port GUID of the networking device on which the Subnet Manager runs.
SM Key	64-bit subnet management key assigned to the Subnet Manager. The Subnet Manager key serves as the prefix of all GIDs and brands nodes as members of this subnet.
Activity Count	Activity counter that increments each time the Subnet Manager issues an subnet management packet (SMP) or that performs other management activities.
Priority	Priority of the Subnet Manager relative to other Subnet Managers in the network. The number 1 has the highest priority.
SM State	State of the Subnet Manager.

Note This menu provides information on subnet managers that are not local to the chassis to which an Element Manager is connected.

Viewing Event Subscriptions

To view the Subnet Management event subscriptions information, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Subnet Management**.

The Subnet Management window opens.

Step 2 Expand the Subnet Manager with services that you want to view.

The navigation menu expands.

Step 3 Choose **Event Subscriptions**.

The LID, Node GUID, and Port Number information appears in the right pane.

Table 8-19 describes the fields under Subnet Management Event Subscriptions Details.

Table 8-19 Subnet Management Event Subscriptions Details

Field	Description
LID	Local ID of the connection.
Node GUID	Global unique ID of the node.
Port Number	Subnet Management port number.
Source QPN	24-bit source queue pair number of the subscriber.
GID	Global ID.
LID Range Start	Lowest legal Local ID number.
LID Range End	Highest legal Local ID number.
Is Generic	If" true," forward all generic traps. If "false," forward all vendor-specific traps.
Type	Type of trap subscribed for.
Trap Number Device ID	If generic, this is the trap number subscribed for. If not generic, this is the device ID subscribed for. 0xFFFF means forward all trap numbers/device IDs.
Response Time Value	Response Time Value of the subscriber.
Producer Type Vendor ID	If not generic, this is the 24-bit IEEE OUI assigned tothe vendor.

Enabling InfiniBand Port Performance Management

Use performance management to view InfiniBand port counters, test connectivity between InfiniBand ports, and monitor InfiniBand ports for errors. To enable InfiniBand-port performance management, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Click the subnet of the ports that you want to manage (for instance, fe:80:00:00:00:00:00:00).

The Port Counter Configuration display appears in the right pane of the window.

Step 3 Choose the **Enable** radio button.

Disabling Performance Management

To disable performance management, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Click the subnet of the ports that you want to manage (for instance, fe:80:00:00:00:00:00:00).

The Port Counter Configuration display appears in the right pane of the window.

Step 3 Choose the **Disable** radio button.

Monitoring Connections

To monitor connections, you complete tasks such as:

- Creating a Connection to Monitor, page 8-48
- Viewing Monitored Connections, page 8-49
- Viewing Connection Counters, page 8-50
- Viewing Connection Monitor Counters, page 8-51
- Testing Connections, page 8-52
- Viewing Port Counters of Connections, page 8-52

Creating a Connection to Monitor

To create a connection to monitor, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Choose **Connection Counters**.

The Monitored Connection tab appears in the right pane of the window.

Step 4 Click **Add**.

The Add Connection window opens.

Step 5 Enter a source LID in the Source LID field.

Note To view available source and destination LIDs, return to the main Element Manager display, click the **InfiniBand** menu, choose **Subnet Management**, and then click the **SwitchRoute** tab. For more information, see the "Viewing Switch Route Details" section on page 8-24.

Step 6 Enter a destination LID in the Destination LID field.

Step 7 Check the **Enable Connection Monitoring** check box.

Note If this check box is not selected, you an view only counter information and cannot view monitoring information.

Step 8 Click **Add**.

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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

The navigation tree expands.

Step 3 Select the **Connection Counters** branch.

The Monitored Connection tab appears in the right pane of the window. Table 8-20 describes the fields in this display.

Table 8-20 Monitored Connections Field Descriptions

Field	Description
Subnet Prefix	Subnet prefix of the monitored connection.
Source LID	16-bit source Local ID of the connection.
Destination LID	16-bit destination Local 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, see the "Configuring Port Monitoring Thresholds" section on page 8-59.
Util Status	Displays unknown, exceeded, or notExceeded to indicate if the utilization value has exceeded the threshold that you configured. To configure thresholds, see the "Configuring Port Monitoring Thresholds" section on page 8-59.

Viewing Connection Counters

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. To view connection counters, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The **Performance Management** window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Select the connection with counters that you want to view.

Step 5 Click the **Connection Counters** tab.

Table 8-21 describes the fields in the display.

Table 8-21 Connection Counters Field Descriptions

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.
Chassis Guid	Global Unique ID (GUID) of the chassis.
Slot Number	Slot of the port.
Ext Port Number	External port number of the port.
Data Is Valid	Displays true or false.
Symbol Errors	Number of symbol errors on the port.
Link Recovery Errors	Number of link recovery errors on the port.
Link Downs	Number of link-down errors on the port.
Received Errors	Number of received errors that the port experienced.
Received Remote Physical Errors	Number of physical errors that the port experienced.
Received Switch Relay Errors	Number of switch relay errors that the port experienced.
Transmitted Discards	Number of transmitted discards that occurred on the port.
Transmitted Constraint Errors	Number of Transmitted Constraint errors that the port experienced.
Received Constraint Errors	Number of Received Constraint errors that the port experienced.
Local Link Integrity Errors	Number of logical link integrity errors on the port.
Excessive Buffer Overrun Errors	Number of excessive buffer overrun errors on the port.
VL15 Dropped	Number of VL15 drops on the port.
Transmitted Data	Volume of transmitted data on the port.
Received Data	Volume of received data on the port.

Table 8-21 Connection Counters Field Descriptions (continued)

Field	Description
Transmitted Packets	Volume of transmitted packets on the port.
Received Packets	Volume of received packets on the port.

Viewing Connection Monitor Counters

To view connection monitor counters, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Select the connection with counters that you want to view.

Step 5 Click the **Connection Monitor Counters** tab.

Table 8-22 describes the fields in the display.

Table 8-22 Connection Monitor Counters Field Descriptions

Field	Description
Node Guid	Global unique ID of the InfiniBand node of the hop port.
Port Number	Port number of the hop.
Chassis Guid	GUID of the chassis that includes the connection.
Slot Number	Slot number of the port(s) in the connection.
Ext Port Number	External port number of the connection port.
Error Type	Type of error that occurred.

Testing Connections

To test connections, follow these steps:

Step 1 Click the InfiniBand menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Select the connection with counters that you want to view.

Step 5 Click the **Test Connection** tab.

Step 6 Click **Test**.

Viewing Port Counters of Connections

To view port counters, follow these steps:

Step 1 Click the InfiniBand menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Expand the connection with port counters that you want to view.

Step 5 Select the port (in GUID - port-number format) with counters that you want to view.

Table 8-23 describes the fields in this display.

Table 8-23 Port Counters Field Descriptions

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.
Chassis Guid	GUID of the chassis that includes the connection.
Slot Number	Slot number of the port(s) in the connection.
Ext Port Number	External port number of the connection port.
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 that the port training state machine has failed the link error recovery process and downed the link.

Table 8-23 Port Counters Field Descriptions (continued)

Field	Description
Received Errors	Total number of packets containing an error that was received on the port. These errors are as follows: • 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 are as follows: • DLID mapping • VL mapping • Looping (output port = input port).
Transmitted Discards	Total number of outbound packets discarded by the port because the port is down or congested. Reasons for this are as follows: • Output port is in the inactive state • Packet length has exceeded neighbor MTU • Switch lifetime limit has been exceeded • Switch HOQ limit has been exceeded
Transmitted Constraint Errors	Total number of packets not transmitted from the port for the following reasons: • FilterRawOutbound is true and packet is raw • PatitionEnforcementOutbound is true and packet fails the partition key check, the IP version check, or the transport header version check.
Received Constraint Errors	Total number of packets received on the port that are discarded for the following reasons: • FilterRawInbound is true and packet is raw • PartitionEnforcementInbound is true and the packet fails the partition key check, the IP version check, or the transport header version check.
Local Link Integrity Errors	Number of times that the frequency of packets containing local physical errors exceeded local_phy_errors.
Excessive Buffer Overrun Errors	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.

Table 8-23 Port Counters Field Descriptions (continued)

Field	Description
Transmitted Data	Optional; shall 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. You 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; shall 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. You 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.
Transmitted Packets	Optional; shall 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; shall 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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Port Counters** branch.

Step 4 View port counters using one of the following methods:

- Click the GUID with port counters that you want to view; all available port counters appear.
- Expand the GUID of the node with port counters that you want to view, and then select the port with counters that you want to view.

Counters appear for that individual port. Table 8-24 describes the fields in the port counters display.

Table 8-24 Port Counters Field Descriptions

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.
Chassis Guid	GUID of the chassis that includes the connection.
Slot Number	Slot number of the port(s) in the connection.
Ext Port Number	External port number of the connection port.
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 are as follows: • 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.

Table 8-24 Port Counters Field Descriptions (continued)

Field	Description
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 are as follows: • DLID mapping • VL mapping • Looping (output port = input port).
Transmitted Discards	Total number of outbound packets discarded by the port because the port is down or congested. Reasons for this are as follows: • Output port is in the inactive state • Packet length has exceeded neighbor MTU • Switch lifetime limit has been exceeded • Switch HOQ limit has been exceeded
Transmitted Constraint Errors	Total number of packets not transmitted from the port for the following reasons: • FilterRawOutbound is true and packet is raw • PatitionEnforcementOutbound is true and the packet fails the partition key check, the IP version check, or the transport header version check.
Received Constraint Errors	Total number of packets received on the port that are discarded for the following reasons: • 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	Number of times that the frequency of packets containing local physical errors exceeded local_phy_errors.
Excessive Buffer Overrun Errors	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.
Transmitted Data	(Optional) Value is 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 the packet delimiter and the VCRC. It excludes all link packets. You 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.

Table 8-24 Port Counters Field Descriptions (continued)

Field	Description
Received Data	Optional; shall 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 the packet delimiter and the VCRC. It excludes all link packets. You 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.
Transmitted Packets	Optional; shall 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; shall 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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Port Counters** branch.

Step 4 Expand the node of the port with cumulative counters that you want to view.

Step 5 Click the port with navigation counters that you want to view.

Step 6 Click the **Port Cumulative Counters** tab.

Table 8-25 describes the fields in the display.

Table 8-25 Cumulative Port Counters Field Descriptions

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.
Chassis Guid	Global Unique ID (GUID) of the chassis.
Slot Number	Slot of the port.
Ext Port Number	External port number of the port.

Table 8-25 Cumulative Port Counters Field Descriptions (continued)

Field	Description
Error Status	Displays true or false.
Util Status	Number of symbol errors on the port.
Symbol Errors	Number of link recovery errors on the port.
Link Recovery Errors	Number of link-down errors on the port.
Link Downs	Number of received errors that the port experienced.
Received Errors	Number of physical errors that the port experienced.
Received Remote Physical Errors	Number of switch relay errors that the port experienced.
Received Switch Relay Errors	Number of transmitted discards that occurred on the port.
Transmit Discards	Number of Transmit Constraint errors that the port experienced.
Transmit Constraint Errors	Number of Received Constraint errors that the port experienced.
Received Constraint Errors	Number of logical link integrity errors on the port.
Logical Link Integrity Errors	Number of excessive buffer overrun errors on the port.
Excessive Buffer Overrun Errors	Number of VL15 drops on the port.
VL15 Dropped	Volume of transmitted data on the port.
Transmit Data	Volume of received data on the port.
Received Data	Volume of transmitted packets on the port.
Transmit Packets	Volume of received packets on the port.
Received Packets	Subnet prefix of the subnet on which each hop resides.
Transmit Rate	Global unique ID of the node (switch chip, HCA, or TCA) of the next-hop port.
Received Rate	Port number (on the appropriate node) of the hop.

Enabling Port Monitoring

To enable port monitoring, follow these steps:

Step 1 Click the InfiniBand menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Select the **Port Monitor** branch.

Step 4 Click the **General** tab.

Step 5 Choose **Enable** from the State drop-down menu.

Note **Enable** enables port monitoring only for the ports that are configured in the Monitor Port Config table; **enableAll** enables port monitoring for all ports regardless of whether the port is configured in the Monitor Port Config table or not.

Step 6 Click **Apply**.

Configuring Port Monitoring

Step 1 Click the InfiniBand menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

The navigation tree expands.

Step 3 Select the **Port Monitor** branch.

Step 4 Click the **General** tab.

Step 5 Enter an integer value between 1 and 600 in the Polling Period field to configure the number of seconds between polls.

Step 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, follow these steps:

Step 1 Click the InfiniBand menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

The navigation tree expands.

Step 3 Select the **Port Monitor** branch.

Step 4 Click the **Threshold** tab.

Step 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.

Step 6 Click **Apply**.

Resetting Counters

You can reset counters for the following:

- Resetting Counters on a Hop, page 8-60
- Resetting Counters on All Ports on a Node, page 8-60
- Resetting Counters on All Ports in a Connection, page 8-61
- Resetting All Counters in a Subnet, page 8-61

Resetting Counters on a Hop

To reset counters on a hop, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Expand the connection that includes the hop that you want to clear.

Step 5 Right-click the hop with counters you want to clear and choose **Clear counters on this Hop**.

Resetting Counters on All Ports on a Node

To reset counters on all ports of a node, follow these steps:

Step 1 Click the InfiniBand menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Expand the connection that includes the node that you want to clear.

Step 5 Right-click the node with counters you want to clear and choose **Clear counters on this Node**.

Resetting Counters on All Ports in a Connection

To reset counters on all ports in a connection, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Expand the **Connection Counters** branch.

Step 4 Right-click the connection with counters you want to clear and choose **Clear counters on this Connection**.

Resetting All Counters in a Subnet

To reset all counters in a subnet, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Performance Management**.

The Performance Management window opens.

Step 2 Expand the subnet of the connections that you want to monitor.

Step 3 Right-click the **Connection Counters** branch and choose **Clear Counters for All Connections**.

Launching the Topology View

To launch the topology view, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column of any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology appears.

Note Navigation icons appear at the top of the InfiniBand Topology window. Table 8-26 describes these icons.

Table 8-26 InfiniBand Topology Navigation Icons

Icon	Description
	The Refresh icon refreshes the topology display.
	The Layout icon evenly arranges the switch and HCA icons.
	The Zoom In icon enlarges the display.
	The Zoom Out icon condenses the display.
	The Fit to Screen icon zooms in or out to fit the topology in the window.
	The Specify Topspin Devices icon opens the Specify Cisco Devices dialog box to add Server Switches to the display.
	The Legend icon displays the different colors that represent different types of links.
Details	The Subnet Details icon displays subnet details. For more information, see the "Viewing Subnet Details" section on page 8-64.
	The Help icon launches the online help.

Viewing Internal Server Switch Components and TCAs

To view the internal server switch components and target channel adapters (TCAs) inside a server switch, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column of any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Note Navigation icons appear at the top of the InfiniBand Topology window. Table 8-27 describes these icons.

Table 8-27 Internal InfiniBand Topology Navigation Icons

Icon	Description
	The Layout icon evenly arranges the switch and HCA icons.
	The Zoom In icon enlarges the display.
	The Zoom Out icon condenses the display.
	The Fit to Screen icon zooms in or out to fit the topology in the window.
	The Layout icon evenly arranges the switch and HCA icons.
SMAs	The Subnet Management Agents icon displays Subnet Manager agent details. For information, see the "Viewing Subnet Management Agents" section on page 8-68.
	The Help icon launches the online help.

Viewing Subnet Details

You can view any of the following subnet details:

- Viewing Nodes, page 8-64
- Viewing Ports, page 8-65
- Viewing Switches, page 8-66
- Viewing Neighboring Ports, page 8-67

Viewing Nodes

To view the nodes in the topology view, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column of any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Click **Details**.

The InfiniBand Subnet Details window opens.

Step 5 Click the **Nodes** tab.

Table 8-28 describes the fields in this tab.

Table 8-28 Nodes Tab Field Descriptions

Field	Description
SubnetPrefix	Subnet prefix of the node.
GUID	Global unique ID (GUID) of the node.
Description	Optional text string describing this node.
Type	Type of node being managed.
NumPorts	Number of physical ports on this node.
SystemImageGUID	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, follow these steps:

Step 1 Click the InfiniBand menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column of any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Click **Details**.

The InfiniBand Subnet Details window opens.

Step 5 Click the **Ports** tab.

Table 8-29 describes the fields in this tab.

Table 8-29 Ports Tab Field Descriptions

Field	Description
SubnetPrefix	Subnet prefix of the node.
NodeGUID	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.
State	State of the port, as follows: • noStateChange • sleep • polling • disabled • portConfigurationTraining • linkup • linkErrorRecovery • reserved • active • down
LinkWidthActive	Currently active link width, indicated as follows: • 1: 1x • 2: 4x • 8: 12x • 0, 3, 4-7, 9-255 reserved

Viewing Switches

To view the switches in the topology view, follow these steps:

Step 1 Click the InfiniBand menu and choose**Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column of additional InfiniBand devices to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Click **Details**.

The InfiniBand Subnet Details window opens.

Step 5 Click the **Switches** tab.

Table 8-30 describes the fields in this tab.

Table 8-30 Switches Tab Field Descriptions

Field	Description
SubnetPrefix	Subnet prefix of the node.
NodeGUID	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 where DLID does not exist in the random forwarding table.
DefPriMcastPort	Forward to this port all the multicast packets from the other ports where DLID does not exist in the forwarding table.
DefNonPriMcastPort	Forward to this port all the multicast packets from the smDefPriMcastPort port where DLID does not exist in the forwarding table.
LifeTimeValue	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	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.

Table 8-30 Switches Tab Field Descriptions (continued)

Field	Description
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 Neighboring Ports

To view neighboring ports in the topology view, follow these steps:

Step 1 Click the **InfiniBand** menu and choose**Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check bo, in the Enabled column of any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Click **Details**.

The InfiniBand Subnet Details window opens.

Step 5 Click the **Neighbors** tab.

Table 8-31 describes the fields in this tab.

Table 8-31 Neighbors Tab Field Descriptions

Field	Description
SubnetPrefix	Used to identify InfiniBand subnet that this InfiniBand node is located in.
LocalNodeGuid	Global unique ID (GUID) of the InfiniBand node.
LocalPortId	Port ID of the InfiniBand node.
LocalNodeType	Identifies the InfiniBand node's node-type, as follows. • channelAdapter • switch
RemoteNodeGuid	Global unique ID (GUID) of the remote InfiniBand node.
RemotePortId	Port ID of the remote InfiniBand node.
RemoteNodeType	Identifies the remote InfiniBand node's node-type, as follows: • channelAdapter • switch

Table 8-31 Neighbors Tab Field Descriptions (continued)

Field	Description
LinkState	Identifies the state of the link connecting the neighbors, as follows: • noStateChange • down • initialize • active
LinkWidthActive	Width of the link connecting the neighbors.

Viewing Subnet Management Agents

You can view any of the following Subnet Manager Agent details:

- Viewing Subnet Manager Node Details, page 8-68
- Viewing Subnet Manager Switch Details, page 8-69
- Viewing Subnet Manager Agent Switch Cap Details, page 8-70
- Viewing Subnet Manager Agent Ports(1) Details, page 8-71
- Viewing Subnet Manager Agent Ports(2) Details, page 8-73
- Viewing Subnet Manager Multicast Details, page 8-75
- Viewing Subnet Manager Agent Linear Forwarding Table Details, page 8-75
- Viewing the Subnet Manager Agent Partition Details, page 8-76
- SLVL Map, page 8-77

Viewing Subnet Manager Node Details

To view Subnet Manager Agent node details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

Step 5 The Internal InfiniBand Topology window opens.

Step 6 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 7 Click the **Nodes** tab.

Table 8-32 describes the fields in this tab.

Table 8-32 Nodes Tab Field Descriptions

Field	Description
Guid	Subnet prefix of this InfiniBand subnet.
BaseVersion	Supported base management datagram version.
ClassVersion	Supported subnet management class.
Type	Type of node being managed: • 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.
PartitionCap	Number of entries in the partition table for CA, 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 the device manufacturer.
Revision	Device revision assigned by manufacturer.
LocalPortNum	The link port number that this SNMP packet came in on.
VendorId	Device vendor ID, per IEEE.
TrapBuffer	Special-purpose string buffer for InfiniBand Trap Data.
String	Description of the node.
NumPorts	Number of physical ports on this node.

Viewing Subnet Manager Switch Details

To view Subnet Manager Agent switch details, follow these steps:

Step 1 Click the InfiniBand menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

Step 6 The Subnet Manager Agents window opens.

Step 7 Click the **Switches** tab.

Table 8-33 describes the fields in this tab.

Table 8-33 Switches Tab Field Descriptions

Field	Description
Guid	Global unique ID of the switch.
LftTop	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 where DLID does not exist in the random forwarding table
DefMcastPriPort	Forward to this port all the multicast packets from the other ports where DLID does not exist in the forwarding table.
DefMcastNPPort	Forward to this port all the multicast packets from the Default Primary port where DLID does not exist in the forwarding table.
LifeTimeValue	Time that a packet can live in the switch.
PortStateChange	Set to one when 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 not change this bit. This bit is cleared by writing one; writing zero is ignored.
LidsPerPort	Number of LID/LMC combinations that may be assigned to a given external port for switches that support the random forwarding table.

Viewing Subnet Manager Agent Switch Cap Details

To view Subnet Manager Agent switch cap details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **Switch Cap** tab.

Table 8-34 describes the fields in this tab.

Table 8-34 Switch Cap Tab Field Descriptions

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	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.

Viewing Subnet Manager Agent Ports(1) Details

To view Subnet Manager Agent port details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column of any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **Ports (1)** tab.

Table 8-35 describes the fields under this tab.

Table 8-35 Ports (1) Tab Field Descriptions

Field	Description
NodeGuid	64-bit GUID of the node that contains this port.
IbPort	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 8-35 Ports (1) Tab Field Descriptions (continued)

Field	Description
Lid	16-bit base LID of this port.
MasterSMLid	16-bit base LID of the master Subnet Manager that is managing this port.
CapabilityMask	Supported capabilities of this node are as follows: • 0: Reserved, shall 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, shall be zero • 16: IsConnectionManagerSupported • 17: IsSNMPTunnelingSupported • 18: Reserved, shall be zero • 19: IsDeviceManagementSupported • 20: IsVendorClassSupported • 21-31: Reserved, shall be zero
DiagCode	Port diagnostic code.
MKeyLeasePeriod	Timer value used to indicate how long the M_Key protection bits are to remain nonzero 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 is as follows: • noStateChagne • down • initialize • armed • active

Table 8-35 Ports (1) Tab Field Descriptions (continued)

Field	Description
PortPhys	State of the physical port is as follows: • noStateChange(0), • sleep • polling • disabled • portConfigurationTraining • linkup • linkErrorRecovery • reserved • linkDownDef
LinkDownDef	Port physical state link down.
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 transmission.
MasterSMSL	Administrative SL of the master Subnet Manager that is managing this port.

Viewing Subnet Manager Agent Ports(2) Details

To view extended Subnet Manager Agent port details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **Ports (2)** tab.

Table 8-36 describes the fields in this tab.

Table 8-36 Ports (2) Tab Field Descriptions

Field	Description
NodeGuid	64-bit GUID of the node that contains this port.
IbPort	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	Number of sequential packets dropped that caused the port to enter the VLStalled state.
HoQLife	Time that a packet can live at the head of a VL queue.
OpVLs	Virtual Lanes operational on this port.
PkeyEnfIn	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 were received on the port and had an invalid M_Key, since power on or reset.
PKeyViolations	Number of packets that were received on the port and had an invalid P_Key, since power on or reset.
QKeyViolations	Number of packets that have been received on the port that have had an invalid Q_Key, since power on 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.

Viewing Subnet Manager Multicast Details

To view Subnet Manager Agent multicast details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **Mcast** tab.

Table 8-37 describes the fields in this tab.

Table 8-37 Mcast Tab Field Descriptions

Field	Description
NodeGuid	Global unique ID 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 are 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. An invalid LID is indicated with an all zero PortMask.

Viewing Subnet Manager Agent Linear Forwarding Table Details

To view Subnet Manager Agent linear forwarding table details, follow these steps:

Step 1 Click the InfiniBand menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **Linear Forwarding** tab.

Table 8-38 describes the fields in this tab.

Table 8-38 Linear Forwarding Tab Field Descriptions

Field	Description
NodeGuid	Global unique ID of the node.
BlockIndex	Index into the linear forwarding table; this index starts from 1 rather than 0.
Block	Linear forwarding table block.

Viewing the Subnet Manager Agent Partition Details

To view Subnet Manager Agent partition details, follow these steps:

Step 1 Click the InfiniBand menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **PKey** tab.

Table 8-39 describes the fields in this tab.

Table 8-39 PKey Tab Field Descriptions

Field	Description
NodeGuid	Global unique ID of the node.
IbPort	Port number.
Index	PKEY table index.
TableVector	GUID assigned by the Subnet Manager on the subnet.

SLVL Map

To view Subnet Manager Agent SLVL details, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **Topology** View.

The Specify Topspin Devices dialog box opens.

Step 2 (Optional) Click the check box in the Enabled column for any additional InfiniBand devices that you want to add to the Topology View display.

Step 3 Click **OK**.

The InfiniBand Topology window appears.

Step 4 Double-click a server switch icon.

The Internal InfiniBand Topology window opens.

Step 5 Click **SMAs**.

The Subnet Manager Agents window opens.

Step 6 Click the **SLVL Map** tab.

Table 8-40 describes the fields in this tab.

Table 8-40 SLVL Map Tab Field Descriptions

Field	Description
NodeGuid	Global unique ID of the node.
InIbPort	Ingress port number.
OutIbPort	Egress port number.
Sl#toVI	SL# to VL mapping.

Viewing Device Management

Device Management (DM) features only are available on I/O chassis (Cisco SFS 3001 and Cisco SFS 3012). With Device Management, you can do the following:

- Viewing IOUs, page 8-77
- Viewing IOCs, page 8-78
- Viewing IOC Services, page 8-79

Viewing IOUs

To view the I/O Units (IOUs) on your device, follow these steps:

Step 1 Click the InfiniBand menu and choose **DM**.

The Device Manager window opens.

Step 2 Click the **IOU** tab.

IOU details appear in the right pane. Table 8-41 describes the fields in this display.

Table 8-41 IOU Display Field Descriptions

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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **DM**.

The Device Manager window opens.

Step 2 Click the **IOC** tab.

A table of IOC details appears. Table 8-42 describes the fields in this display.

Table 8-42 IOCs Display Field Descriptions

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.
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.

Table 8-42 IOCs Display Field Descriptions (continued)

Field	Description
Controller Op Cap	Integer value (from 8 cumulative bits) between 1 and 255 that represents the operation type(s) that the IOC supports. • 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, follow these steps:

Step 1 Click the **InfiniBand** menu and choose **DM**.

Step 2 The Device Manager window opens.

Step 3 Click the **IOC Services** tab.

A table of IOC Services details appears. Table 8-43 describes the fields in this table.

Table 8-43 IOC Services Table Field Descriptions

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.

Viewing Forwarding Tables

Viewing Multicast Forwarding

To view the multicast forwarding configuration, follow these steps:

Step 1 Click the **InfiniBand** menu and choose either **Subnet Management** or **Subnet Management(Tabular format)**.

Step 2 Click the **MulticastForwardings** tab.

You see the information shown in Table 8-44.

Table 8-44 Multicast Forwarding Entries

Field	Description
Node GUID	Guid of the switch node in the subnet with the FDB that you want to access.
MLID	Local ID of the subnet.
Port Mask	Port mask.

Viewing Linear Forwarding

To view the linear forwarding configuration, follow these steps:

Step 1 Click the **InfiniBand** menu and choose either **Subnet Management** or **Subnet Management(Tabular format)**.

Step 2 Click the **LinearForwardings** tab.

You see the information shown in Table 8-45.

Table 8-45 Linear Forwarding Entries

Field	Description
Node GUID	Guid of the switch node in the subnet with the FDB that you want to access.
LID	Local ID of the subnet.
Port Number	Port number.