

**Quantum**<sup>®</sup>

# SNMP Reference Guide

## Quantum DXi-Series



Quantum DXi-Series SNMP Reference Guide, 6-67082-06 Rev B, July 2013, Product of USA.

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# Preface

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This manual provides a reference to using SNMP (Simple Network Management Protocol) with a Quantum DXi™-Series system.

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## Audience

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This manual is written for DXi™ system administrators and field service engineers.

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**Note:** It is useful for the audience to have a basic understanding of UNIX® and backup/recovery systems.

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## Document Organization

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Following is a brief description of chapter contents.

- [Chapter 1, Description](#) provides an overview of SNMP.
- [Chapter 2, SNMP Agent](#) provides information on the SNMP agent.
- [Chapter 3, SNMP Traps](#) provides information on the supported SNMP traps.

## Notational Conventions

This manual uses the following conventions:

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**Note:** Note emphasizes important information related to the main topic.

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**Caution:** Caution indicates potential hazards to equipment or data.

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**WARNING:** Warning indicates potential hazards to personal safety.

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- Right side of the system - Refers to the right side as you face the component being described.
- Left side of the system - Refers to the left side as you face the component being described.
- Data sizes are reported in base 1000 rather than base 1024. For example:
  - 1 MB = 1,000,000 bytes
  - 1 GB = 1,000,000,000 bytes
  - 1 TB = 1,000,000,000,000 bytes

## Related Documents

The following Quantum documents are also available for DXi-Series systems:

Document No.	Document Title	Document Description
6-00618	<i>System Safety and Regulatory Information - Quantum Products</i>	Lists all safety and regulatory information for all Quantum products.

For the most up to date information on the DXi-Series, see:

<http://www.quantum.com/ServiceandSupport/Index.aspx>

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## Contacts

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Quantum company contacts are listed below.

### Quantum Corporate Headquarters

To order documentation on the <Product Name> or other products contact:

Quantum Corporation (*Corporate Headquarters*)  
 1650 Technology Drive, Suite 700  
 San Jose, CA 95110-1382

### Quantum Home Page

Visit the Quantum home page at:

<http://www.quantum.com>

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# Chapter 1 Description

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Simple Network Management Protocol (SNMP) is a light-weight protocol designed for remote management and monitoring of infrastructure devices. DXi-Series systems (DXi V-Series, DXi4000, DXi6000, and DXi8500) provide SNMP support so you can use a framework application to monitor the status of the system. Using SNMP, you can be alerted of numerous system events.

The DXi also provides detailed status reports from its own reporting system, called the Reliability, Availability, and Serviceability (Service) ticket system. Service tickets enable system administrators to diagnose specific system events.

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## SNMP Functionality Available to Remote Applications

The DXi supports standard SNMP functionality, including GET queries and unicast traps (which can be sent only to registered recipients), that enables you to monitor system status from a remote application. SET commands are currently not enabled on the DXi.

All DXi MIB variables are supported by Quantum for remote management of the system.

Specific SNMP characteristics include:

- Supports SNMP v1 and v2c.
- Supports SNMP v1 and v2 traps as defined by RFC 1157. You can set the system to report SNMP traps using either v1 or v2 (v1 is the default). The timeout for all SNMP requests to the system must be at 10 seconds or greater (command line parameter-t).
- SMIv2 compliance only.
- Usage of port 161 for GET queries.
- Default community read/trap strings: *publicCmtyStr* (see [SNMP Community Strings](#) on page 6).
- Trap Registration interface in the system's remote web client, which enables you to configure application IP addresses, transport protocols, and user-configurable UDP port numbers to receive traps

---

## Accessing SNMP Information

SNMP information can be obtained from the DXi using traps and GET queries. Using the information contained in this guide, system administrators can configure their framework application to generate alerts to receive SNMP information.

By default, most SNMP information is returned as an integer value (system partition names, however, are returned as string values). For instance, the return value of *system Main Door* might be 2, which indicates that the system door is closed.

You can, however, configure the framework application to return status information as a string value, which provides a description of the status.

---

### SNMP Version

---

The DXi supports SNMP version 1 and version 2c for MIB information retrieval.

To access the system for SNMP support, use the following values as needed in the remote management application:

- **User name** - Admin

- **Context name** - (None. Leave this field blank.)
- **Authentication protocol** - MD5
- **Privacy protocol** - (None. Leave this field blank.)
- **Password** - Your Admin password

For secure access to the system using SNMP, disable SNMPv1 and SNMPv2c access from the remote management console.

---

## SNMP Traps

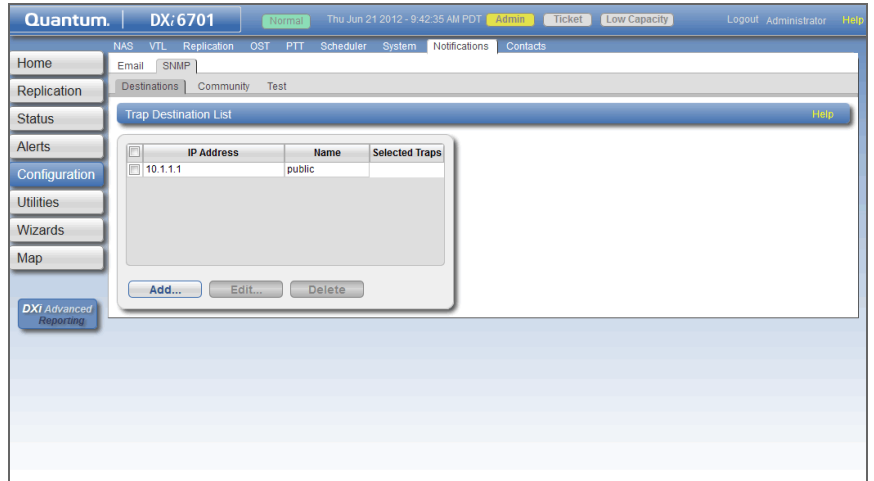
Traps enable alerts to be sent automatically to registered hosts when specific events occur. Only one application per UDP port can listen for traps.

The DXi supports SNMP v1 and v2 traps as defined by RFC 1157. The timeout for all SNMP requests to the system must be at 10 seconds or greater (command line parameter-t).

To receive traps, perform the following steps:

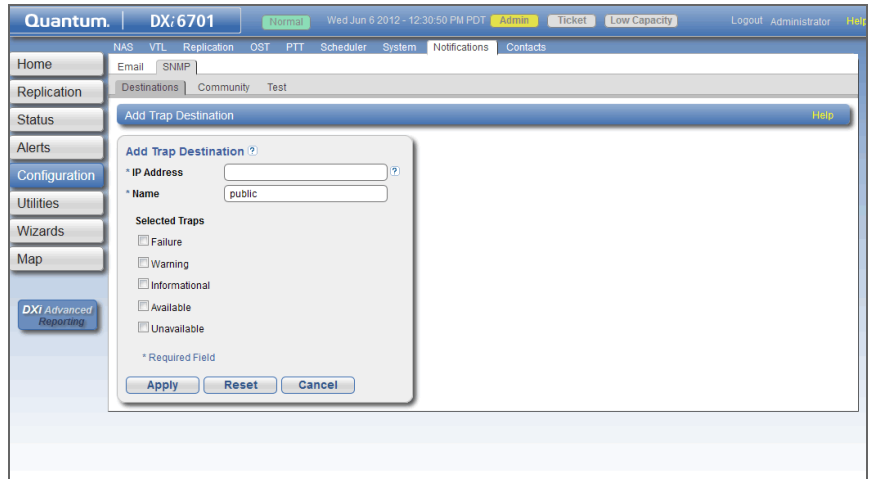
- 1 Configure your framework application to collect traps from the DXi.
  - Access the DXi remote management console and navigate to the **Configuration > Notifications > SNMP > Destinations** page (see [Figure 1](#)).

Figure 1 Destinations Page  
(DXi6701 Shown)



2 Click **Add** to add an SNMP destination (see [Figure 2](#)).

Figure 2 Add Trap Destination  
Page (DXi6701 Shown)



3 Enter information about the destination:

- **IP Address** - Enter the IP address of the system that will receive the traps generated by the DXi.

---

**Note:** When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon [?] located near the IP address field.

---

- **Name** - Enter the name of the destination.
- 4 Select one or more traps to send to the destination:
- **Failure** - Sends failure traps.
  - **Warning** - Sends warning traps.
  - **Informational** - Sends informational traps.
  - **Available** - Sends a trap when the system transitions from an unavailable to an available state.
  - **Unavailable** - Sends a trap when the system transitions from an available to an unavailable state.
- 5 Click **Apply**.

For more information about registering a host with the DXi, see the *User's Guide* for your DXi system.

---

## SNMP Queries

SNMP queries, or GET queries, can be initiated on a periodic basis by the framework application. By querying the MIB, hosts can gather status information about specific components of the system. Frequent MIB queries are not required, however, since the SNMP agent is event-driven.

---

**Note:** As with any SNMP device, excessive MIB queries can result in performance degradation for the SNMP daemon, as well as for the network.

---

GETs must also include an instance ID. The instance identifies a specific device from which you can retrieve status information. For example, to determine if the second partition on a DXi is online, access the MIB variable for logical system online status and select the instance for partition 2.

## SNMP Community Strings

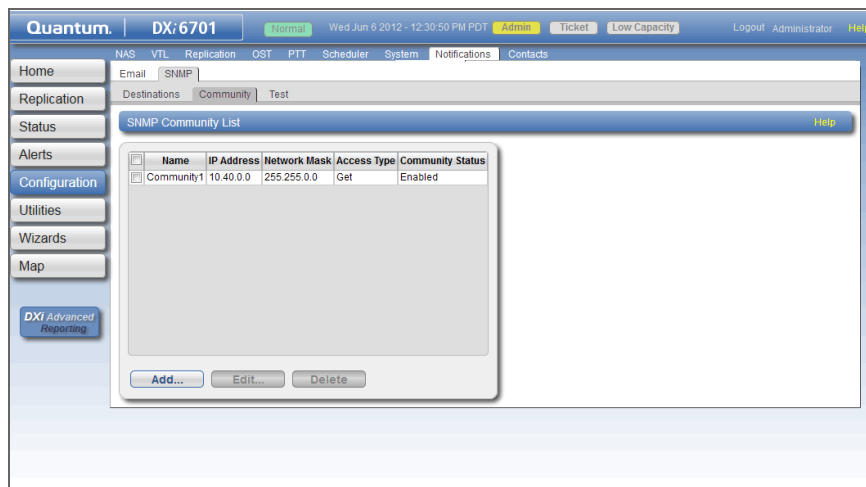
An SNMP community string is a text string that acts as a password to authenticate messages sent between the SNMP remote management application and the device (the SNMP agent). SNMP **Get** and **Get-next** requests are valid only if the community string in the request matches the community string at the device. If the community strings do not match, either modify the community string at the device so that it is the string that the management station expects, or modify the management station so that it uses the device's community strings.

The community string is included in every SNMPv1 and SNMPv2C packet transmitted between the SNMP manager and the SNMP agent. This string is case sensitive, cannot be empty, and cannot exceed 32 characters.

To add a community:

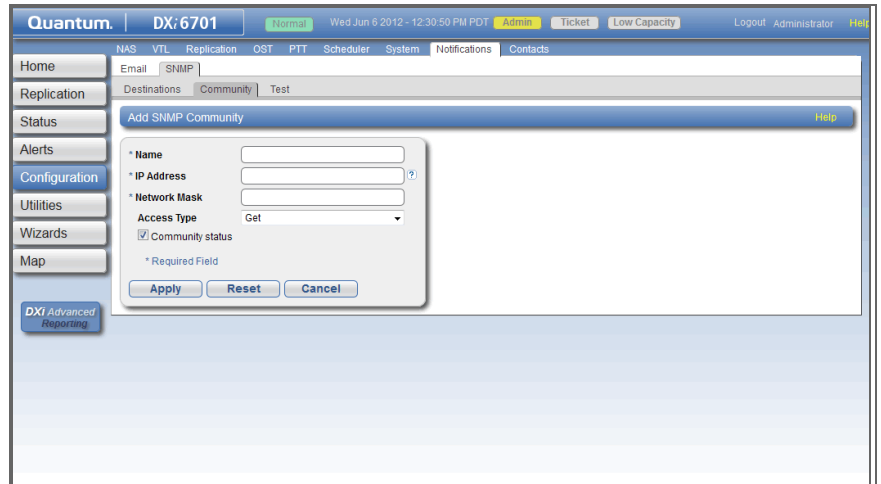
- 1 Access the DXi remote management console and navigate to the **Configuration > Notifications > SNMP > Community** page (see [Figure 3](#)).

Figure 3 Community Page  
(DXi6701 Shown)



- 2 Click **Add** to an SNMP community (see [Figure 4](#)).

Figure 4 Add SNMP  
Community Page (DXi6701  
Shown)



**3** In the **Name** box, enter a unique **Name** for the community (up to 20 characters).

Valid characters are letters, numbers, hyphens, and underscores.

**4** Enter a valid **IP Address and Network Mask** pair.

A pair is valid if performing a logical bitwise **AND** operation on the IP address and the network mask results in the IP address. See the table below for examples:

IP Address / Network Mask	Result
10.40.166.87 255.255.255.255	Allows access only from 10.40.166.87
10.40.166.87 10.40.166.87	Allows access only from 10.40.166.87
10.40.166.87 10.40.166.0	Invalid because the logical bitwise operation (address <b>AND</b> mask) is not equal to the address
10.40.166.87 255.255.0.0	Invalid because the logical bitwise operation (address <b>AND</b> mask) is not equal to the address

IP Address / Network Mask	Result
10.40.0.0 255.255.0.0	Allows access from any client with address 10.40.xx.xx

---

**Note:** If you define a single community and set both the IP address and network mask to 0.0.0.0 (or leave both blank), then IP address-based access control is disabled. In this case, the SNMP agent is accessible from any IP address.

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**Note:** When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon [?] located near the IP address field.

---

- 5 In the **Access Type** drop-down box, select the access type for the community:
  - **Get** - Allows SNMP get operations.
  - **Get/Set** - Allows both SNMP **get** and **put** operations.
- 6 Select the **Community status** check box to enable the community. Or clear the **Community status** check box to disable the community.
- 7 Click **Apply**.





## Chapter 2 SNMP Agent

---

The DXi operating system is running Linux and the SNMP Agent residing within the DXi is the Net-SNMP 5.7.1. Whenever a request comes in to the SNMP Agent, the agent will parse the request and decide how to process. The SNMP Agent responds directly to any requests for non-Quantum specific MIB objects such as the MIB-II (defined in rfc1213) but if the request is for a Quantum specific MIB object, it will pass the data to the SNMP subagent that processes all the Quantum specific MIB objects. The SNMP subagent processes the request and returns the data to the Net-SNMP agent.

---

### Quantum SNMP MIB

The SNMP agent that supports the DXi system also supports the general Quantum MIB, QUANTUM-SNMP.MIB. The object ID for the Quantum MIB is as follows (see [Figure 5](#)):

```
.1(iso).3(org).6(dod).1(internet).4(private).1(enterprises).2036(atlp).  
2(quantum).1(quantumsnmp)
```

---

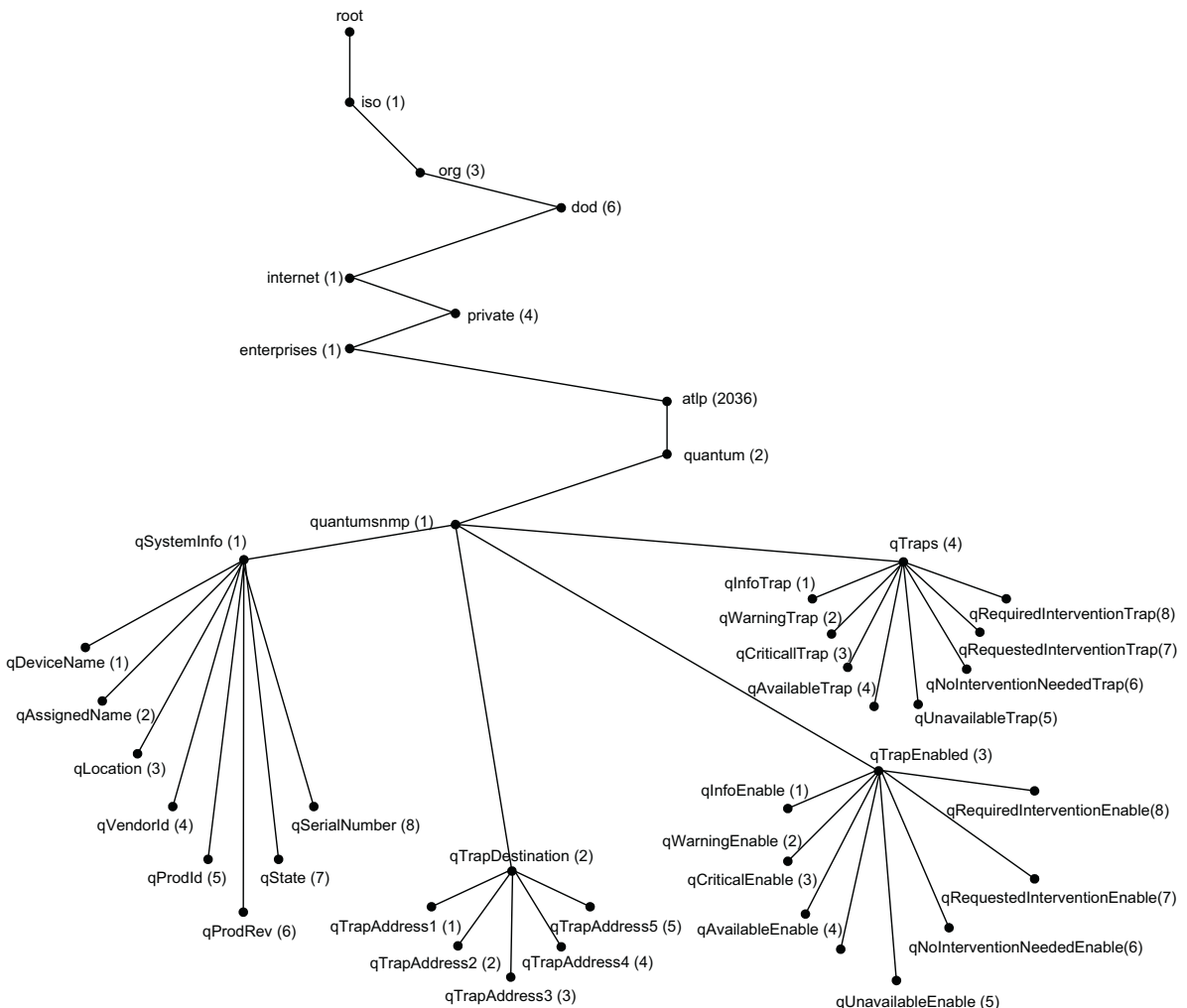
**Note:** A copy of the QUANTUM-SNMP.MIB is located on the product documentation CD provided with the DXi.

---

There are 5 groups under .1(quantumsnmp) tree:

qSystemInfo	.1.3.6.1.4.1.2036.2.1.1
qTrapDestination	.1.3.6.1.4.1.2036.2.1.2
qTrapEnable	.1.3.6.1.4.1.2036.2.1.3
qTraps	.1.3.6.1.4.1.2036.2.1.4
qSerialNumber	.1.3.6.1.4.1.2036.2.1.1.12

Figure 5 Quantum SNMP  
Object ID



## qSystemInfo Group

The DXi supports the following 8 of objects of the qSystemInfo group. Some are read-only (RO) objects; some are read-write (RW) objects; and some are "accessible-for-notify" objects. The "accessible-for-notify" objects are objects that will be sent as information when notifications or traps are sent, not readable or writable from a management console. From the management console, only the get request operation can be applied to the RO objects, and both get and set request operations can be applied to the RW objects.

### qDeviceName

qDeviceName is a RO object, with the object ID .1.3.6.1.4.1.2036.2.1.1.1. This is the host name of the device.

### qAssignedName

qAssignedName is a RW object, with the object ID .1.3.6.1.4.1.2036.2.1.1.2. This is the emulated storage library name. If none is given, the default value is the name of the device (qDeviceName).

### qLocation

qLocation is a RW object, with the object ID .1.3.6.1.4.1.2036.2.1.1.3. This is the location of the DXi. If none is provided, the value is an empty string.

### qVendorId

qVendorId is a RO object, with the object ID .1.3.6.1.4.1.2036.2.1.1.4. This is the manufacturing vendor ID.

### qProdId

qProdId is a RO object, with the object ID .1.3.6.1.4.1.2036.2.1.1.5. This is the product model number.

---

**qProdRev**

---

qProdRev is a RO object, with the object ID .1.3.6.1.4.1.2036.2.1.1.6. This is the product revision number.

---

**qState**

---

qState is a RO object, with the object ID .1.3.6.1.4.1.2036.2.1.1.7. This is the current state of the emulated storage library.

---

**qSerialNumber**

---

qSerialNumber is a RO object, with the object ID .1.3.6.1.4.1.2036.2.1.1.12. This is the serial number of the Quantum device.

---

## qTrapDestination Group

There are 5 read-write objects in the qTrapDestination group. They are the IP addresses of the Management Consoles that are allowed to receive traps from the SNMP Agent. The maximum number of trap destination IP addresses that can be set in the agent is 5. Currently the DXi implements these as Read Only objects and the trap addresses are configurable only through the remote management console.

---

**qTrapAddress1**

---

qTrapAddress1 has an object ID of .1.3.6.1.4.1.2036.2.1.2.1. This object is the IP address of the Management Console the traps will be sent to.

---

**qTrapAddress2**

---

qTrapAddress2 has an object ID of .1.3.6.1.4.1.2036.2.1.2.2. This object is the IP address of the Management Console the traps will be sent to.

---

**qTrapAddress3**

---

qTrapAddress3 has an object ID of .1.3.6.1.4.1.2036.2.1.2.3. This object is the IP address of the Management Console the traps will be sent to.

---

**qTrapAddress4**

---

qTrapAddress4 has an object ID of .1.3.6.1.4.1.2036.2.1.2.4. This object is the IP address of the Management Console the traps will be sent to.

---

**qTrapAddress5**

---

qTrapAddress5 has an object ID of .1.3.6.1.4.1.2036.2.1.2.5. This object is the IP address of the Management Console the traps will be sent to.

---

## qTrapEnable Group

There are 8 read-write objects in the qTrapEnable group. Each object determines whether the specific type of trap should be sent to the defined management station(s) or not. If the object value is 1(disabled), the trap will not be sent. If the object value is 2(enabled), the trap will be sent.

---

**qInfoEnable**

---

qInfoEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.1. This object determines whether the device should send the Informational notification to the Management Console.

---

**qWarningEnable**

---

qWarningEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.2. This object determines whether the device should send the Warning notification to the Management Console.

---

**qCriticalEnable**

---

qCriticalEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.3. This object determines whether the device should send the Critical notification to the Management Console.

---

**qAvailableEnable**

---

qAvailableEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.4. This object determines whether the device should notify the management console when the library is available.

---

### **qUnavailableEnable**

---

qUnavailableEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.5. This object determines whether the device should notify the management console when the library is unavailable.

---

### **qNoInterventionNeededEnable**

---

qNoInterventionNeededEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.6. This object determines whether the device should send the "No User Intervention Needed" notification to the Management Console. This object is not used by the DXi.

---

### **qRequestedInterventionEnable**

---

qRequestedInterventionEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.7. This object determines whether the device should send the "Requested User Intervention" notification to the Management Console. This object is not used by the DXi.

---

### **qRequiredInterventionEnable**

---

qRequiredInterventionEnable has an object ID of .1.3.6.1.4.1.2036.2.1.3.8. This object determines whether the device should send the "Required User Intervention" notification to the Management Console. This object is not used by the DXi.

---

## **qTraps Group**

There are 8 objects in the qTraps group, representing the 8 different types of traps. They are v2 traps with information includes: qAssignedName, qSenseKey, qAsc, qAscq, and qTrapDescription.

---

### **qInfoTrap**

---

qInfoTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.1. The informational traps will be sent if qInfoEnable is set to enabled.

---

**qWarningTrap**

---

qWarningTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.2. The warning traps will be sent if qWarningEnable is set to enabled.

---

**qCriticalTrap**

---

qCriticalTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.3. The critical traps will be sent if qCriticalEnable is set to enabled.

---

**qAvailableTrap**

---

qAvailableTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.4. The available traps will be sent if qAvailableEnable is set to enabled.

---

**qUnavailableTrap**

---

qUnavailableTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.5. The unavailable traps will be sent if qUnavailableEnable is set to enabled.

---

**qNoInterventionNeededTrap**

---

qNoInterventionNeededTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.6. The "No User Intervention Needed" traps will be sent if qNoInterventionNeededEnable is set to enabled. This object is not used by the DXi.

---

**qRequestedInterventionTrap**

---

qRequestedInterventionTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.7. The "Requested User Intervention" traps will be sent if qRequestedInterventionEnable is set to enabled. This object is not used by the DXi.

---

**qRequiredInterventionTrap**

---

qRequiredInterventionTrap has an object ID of .1.3.6.1.4.1.2036.2.1.4.8. The "Required User Intervention" traps will be sent if qRequiredInterventionEnable is set to enabled. This object is not used by the DXi.

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## Other Supported MIBs

The Net-SNMP agent also supports MIBII, SNMPv2, and UCD MIBs by default.





## Chapter 3

# SNMP Traps

---

An SNMP trap is generated by an individual component in the DXi device when there is a change or failure in the component and is triggered by the creation of a Service ticket.

A Service ticket event is always reported against the violating FRU. The reporting FRU can be the violating FRU itself, or a peer FRU which determines the violating FRU is in a bad state. In the current interface, it is sometimes necessary to report the violating FRU instance, as well as the parent (of the violating FRU) instance.

The following tables show the list of FRUs and the events that can generate Service tickets.

The following tables describe the system events:

---

**Note:** Only [Table 2](#), [Table 5](#), and [Table 8](#) apply to the DXi V-Series

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- [Table 1 - Server \(Node\) Hardware Events](#)
- [Table 2 - Server \(Node\) Software Events](#)
- [Table 3 - RAID Array Events \(DXi6800 and DXi8500 Only\)](#)
- [Table 4 - Ethernet Switch Events \(DXi8500 Only\)](#)
- [Table 5 - Network Interface Card Events](#)
- [Table 6 - Fibre Channel Switch Events \(DXi8500 Only\)](#)
- [Table 7 - Fibre Channel HBA Events \(DXi6500, Model 6540 and 6550, DXi6700, DXi6800, and DXi8500 only\)](#)
- [Table 8 - Software Events](#)

Table 1 Server (Node)  
Hardware Events

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Boot Drive	Not present	SL_FRU_IOS_DRV/0102	SL_EVT_NOT_PRESEN/9	High	Failed
	IO Error	SL_FRU_IOS_DRV/0102	SL_EVT_IO_ERR/24	High	Warning
	Configuration mismatch	SL_FRU_IOS_DRV/0102	SL_EVT_CONFIGURATION_MISMATCH/77	High	Failed
	Drive Failure	SL_FRU_IOS_DRV/0102	SL_EVT_DRV_FAIL/22	High	Failed
	Drive rebuild failure	SL_FRU_IOS_DRV/0102	SL_EVT_DRV_RBLD_FAIL/46	High	Failed
BUS Communication	Communication failure (internal bus)		SL_EVT_COMM_BUS_FAIL/29	High	Failed
Chassis temperature	The temperature rises Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_OVERTEMP/36	Middle	Warning
	The temperature rises Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_HIGHTEMP/34	High	Failed
	The temperature rises Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_TEMP_DEGRADE/95	High	Failed

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
CPU temperature	The temperature rises Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_OVERTEMP/36	Middle	Warning
	The temperature rises Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_HIGHTEMP/34	High	Failed
	The temperature rises Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_TEMP_DEGRADE/95	High	Failed
Fan speed status, RPM	The speed rises Non-Critical level	SL_FRU_IOS_FAN/0107	SL_EVT_FAN_LOW_SPEED/18	High	Degraded
	The speed rises Critical level	SL_FRU_IOS_FAN/0107	SL_EVT_SPEED_CRITICAL/98	High	Failed
	The speed rises Non-Recoverable level	SL_FRU_IOS_FAN/0107	SL_EVT_SPEED_DEGRADE/99	High	Failed
	Not present	SL_FRU_IOS_FAN/0107	SL_EVT_NOT_PRESENT/9	High	Failed
Intrusion	Cover removed	SL_FRU_IO_SERVER/0101	SL_EVT_INTRUSION/100	Middle	Warning
IPMI		SL_FRU_IPMI/0806			
MB NIC	Link Down	SL_FRU_IO_SERVER/0101	SL_EVT_LINK_FAIL/14	Middle	Warning
Node	Stopped	SL_FRU_IO_SERVER/0101	SL_EVT_STOPPED/101	High	Failed
	Unavailable	SL_FRU_IO_SERVER/0101	SL_EVT_COMM_FAIL/25	Middle	Warning
	Node is down	SL_FRU_CLUSTER/0115	SL_EVT_STOPPED/101	High	Failed

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
PCI NIC	Not Present	SL_FRU_NIC_ETHER_PORT/0116	SL_EVT_NOT_PRESENT/9	High	Failed
Power supply	Failure	SL_FRU_IOS_PWR/0106	SL_EVT_PWR_FAIL/17	High	Failed
	Power supply not present	SL_FRU_IOS_PWR/0106	SL_EVT_NOT_PRESENT/9	High	Failed
Serial	Serial communication failure		SL_EVT_COMM_SERIAL_FAIL/27	High	Failed
Voltage status of 1.5v CPU Cores	The voltage rises upper Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_OVERVOLTAGE/10	Middle	Warning
	The voltage rises upper Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_HIGHVOLTAGE/32	High	Failed
	The voltage rises upper Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed
	The voltage rises lower Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_UNDERVOLTAGE/11	Middle	Warning
	The voltage rises lower Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_LOWVOLTAGE/31	High	Failed
	The voltage rises lower Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Voltage status of 3.3v Power Supply	The voltage rises upper Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_OVERVOLTAGE/10	Middle	Warning
	The voltage rises upper Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_HIGHVOLTAGE/32	High	Failed
	The voltage rises upper Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed
	The voltage rises lower Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_UNDERVOLTAGE/11	Middle	Warning
	The voltage rises lower Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_LOWVOLTAGE/31	High	Failed
	The voltage rises lower Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Voltage status of 5v Power Supply	The voltage rises upper Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_OVERVOLTAGE/10	Middle	Warning
	The voltage rises upper Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_HIGHVOLTAGE/32	High	Failed
	The voltage rises upper Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed
	The voltage rises lower Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_UNDERVOLTAGE/11	Middle	Warning
	The voltage rises lower Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_LOWVOLTAGE/31	High	Failed
	The voltage rises lower Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Voltage status of 12v Power Supply	The voltage rises upper Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_OVERVOLTAGE/10	Middle	Warning
	The voltage rises upper Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_HIGHVOLTAGE/32	High	Failed
	The voltage rises upper Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed
	The voltage rises lower Non-Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_UNDERVOLTAGE/11	Middle	Warning
	The voltage rises lower Critical level	SL_FRU_IO_SERVER/0101	SL_EVT_LOWVOLTAGE/31	High	Failed
	The voltage rises lower Non-Recoverable level	SL_FRU_IO_SERVER/0101	SL_EVT_VOLTAGE_DEGRADE	High	Failed

Table 2 Server (Node) Software Events

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Configurat ion	Configuration not recommended		SL_EVT_CFG_NOT_REC/40	Low	Warning
	Configuration not supported		SL_EVT_BADCFG_NOT_SUP/41	Low	Warning
	Bad EVPS configuration		SL_EVT_BADCFG_EVPS/42	Low	Warning
	Configuration not recommended		SL_EVT_CFG_NOT_REC/40	Low	Warning
Database	Database corruption		SL_EVT_DB_CORRUPT/61	High	Failed
Filesystem	File not found		SL_EVT_FILE_NOT_PRESENT/69	Low	Warning
	File system not found		SL_EVT_FILESYS_NOT_PRESENT/70	High	Failed
Keep Alive	Cluster task failed	SL_FRU_CLUSTER/0115	SL_EVT_FAILOVER_ERROR/79	High	Failed
	Application task failed	SL_FRU_CLUSTER/0115	SL_EVT_TASK_DIED/1	High	Failed
Maintenan ce	Maintenance operation has failed		SL_EVT_MAINT_FAIL/56	High	Failed



Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Media	Media has expired		SL_EVT_MEDIA_EXPIRED/57	Low	Warning
	Tape alert		SL_EVT_TAPE_ALERT/58	Low	Warning
	Duplicate barcode		SL_EVT_MEDIA_DUPLICATE/63	Low	Warning
	Unknown media		SL_EVT_MEDIA_UNKNOWN/64	Low	Warning
	No media found to satisfy the request.		SL_EVT_NO_MEDIA/75	Low	Warning
Mode	System taken offline		SL_EVT_TAKEN_OFFLINE/71	Low	Warning
Operation	Operation failure		SL_EVT_OP_FAIL/51	High	Failed
Performance	Performance degraded		SL_EVT_PERF_DEGRADED/50	Low	Warning
Reporting	Error reported		SL_EVT_REPORT_ERROR/53	Low	Warning
	Warning reported		SL_EVT_REPORT_WARN/66	Low	Warning
Response	Not responding		SL_EVT_NO_RESPONSE/52	Low	Warning
	Not supported		SL_EVT_NOT_SUPPORTED/67	Low	Warning
Resource	System resource warning		SL_EVT_SYS_RESOURCE_WARN/65	Low	Warning
Vaulting	Vaulting operation failed		SL_EVT_VAULT_FAIL/74	High	Failed

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Virtual Volume	Virtual volume error		SL_EVT_VIRT_VOL_ERR/49	Low	Warning

Table 3 RAID Array Events  
(DXi6800 and DXi8500 Only)

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Alarm	RAID alarm	SL_FRU_RAID_ALARM/0312			
Battery	Battery failure	SL_FRU_RAID_BATTERY/030F		High	Failed
Chassis	Hardware fault	SL_FRU_RAID_CHASSIS/0303	SL_EVT_HW_FAULT/7	High	Failed
Drives		SL_FRU_RAID_DRV/0302			
Fan	Fan failure	SL_FRU_RAID_FAN/0305	SL_EVT_FAN_FAIL/19	High	Failed
	Not present	SL_FRU_RAID_FAN/0305	SL_EVT_NOT_PRESENT/9	High	Failed

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
General	Invalid RAID type (non-ADIC)	SL_FRU_RAID_SENS OR/030C	SL_EVT_RAID_INVALID/21	High	Failed
	Hardware fault	SL_FRU_RAID_SENS ORL	SL_EVT_HW_FAULT/7	High	Failed
	Communication failure	SL_FRU_RAID_SENS ORL	SL_EVT_COMM_FAIL/25	High	Failed
	Wrong firmware level	SL_FRU_RAID_SENS ORL	SL_EVT_WRONG_FW_LEVEL/30	High	Failed
	LUN communication failure	SL_FRU_RAID_SENS ORL	SL_EVT_COMM_LUN_FAIL/48	High	Failed
	Drive failure	SL_FRU_RAID_SENS ORL	SL_EVT_DRV_FAIL/22	High	Failed
	Drive removed	SL_FRU_RAID_SENS ORL	SL_EVT_DRV_REMOVED/23	High	Failed
	Global spare not detected	SL_FRU_RAID_SENS ORL	SL_EVT_NO_GLOB_SPARE/45	High	Degraded
	Drive rebuild failure	SL_FRU_RAID_SENS ORL	SL_EVT_DRV_RBLD_FAIL	High	Failed
	Logical drive failure (data loss)	SL_FRU_RAID_SENS ORL	SL_EVT_LOGDRV_FAIL/47	High	Failed
Power fan canister	Power supply fan failure	SL_FRU_RAID_CRU/0313			

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Power supply	Power supply failure	SL_FRU_RAID_PWR/0304	SL_EVT_PWR_FAIL/17	High	Failed
	Not present	SL_FRU_RAID_PWR/0304	SL_EVT_NOT_PRESEN/9	High	Failed
Sensors	Under temperature	SL_FRU_RAID_SENSOR/030C	SL_EVT_UNDERTEMP/35	Low	Warn
	Over temperature	SL_FRU_RAID_SENSOR/030C	SL_EVT_OVERTEMP/36	Low	Warn
SFP	SFP failure	SL_FRU_RAID_SFP/030E		Low	Warn
Volume	RAID volume has failed	SL_FRU_RAID_VOL/030B	SL_EVT_FAILED/120	High	High
	RAID volume is degraded	SL_FRU_RAID_VOL/030B	SL_EVT_DEGRADED/115	High	Degraded
	RAID volume is impaired	SL_FRU_RAID_VOL/030B	SL_EVT_IMPAIRED/121	High	Warning

Table 4 Ethernet Switch Events  
(DXi8500 Only)

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Fan	Ethernet switch fan speed low	SL_FRU_NWS_FAN/0809	SL_EVT_FAN_LOW_SPEED/18	Middle	Warning
	Ethernet switch fan speed high	SL_FRU_NWS_FAN/0809	SL_EVT_FAN_HIGH_SPEED/97	High	Failed
	Ethernet switch fan fail	SL_FRU_NWS_FAN/0809	SL_EVT_FAN_FAIL/19	High	Failed
	Ethernet switch fan not present.	SL_FRU_NWS_FAN/0809	SL_EVT_NOT_PRESENT/9	High	Failed

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
General	Switch is unavailable	SL_FRU_NW_SWITC H	SL_EVT_COMM_FAI L/25	High	Failed
	Invalid configuration (connection, VLANs)	SL_FRU_NW_SWITC H	SL_EVT_CONFIG_FA IL/102	High	Failed
	Wrong firmware level	SL_FRU_NW_SWITC H	SL_EVT_WRONG_F W_LEVEL/30	High	Failed
	Authentication problems	SL_FRU_NW_SWITC H	SL_EVT_AUTH_FAIL ED/103	High	Failed
	EGP is broken	SL_FRU_NW_SWITC H	SL_EVT_EGP_FAIL/ 104	High	Failed
	Link down	SL_FRU_NW_SWITC H	SL_EVT_LINK_FAIL/ 14	High	Failed
	MAC address variation in table	SL_FRU_NW_SWITC H	SL_EVT_MAC_CHA NGED/105	High	Failed
	Port type changed	SL_FRU_NW_SWITC H	SL_EVT_PORT_FAIL/ 15	High	Failed
	Cold/warm start	SL_FRU_NW_SWITC H	SL_EVT_REBOOT/ 106	Middle	Warning
	Ethernet communication failure		SL_EVT_COMM_ET HER_FAIL	High	Failed
	Ethernet switch not present	SL_FRU_NWS/0803	SL_EVT_NOT_PRESE NT/9	High	Failed
	Ethernet switch invalid	SL_FRU_NWS/0803	SL_EVT_SWITCH_IN VALID/20	High	Failed
	Ethernet switch hardware fault	SL_FRU_NWS/0803	SL_EVT_HW_FAULT/ 7	High	Failed

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Power Supply	Ethernet switch power supply undervolt.	SL_FRU_NWS_PWR/0810	SL_EVT_UNDERVOLTAGE/11	Middle	Warning
	Ethernet switch power supply overvolt	SL_FRU_NWS_PWR/0810	SL_EVT_OVERVOLTAGE/10	High	Failed
	Ethernet switch power supply fail	SL_FRU_NWS_PWR/0810	SL_EVT_PWR_FAIL/17	High	Failed
	Ethernet switch power supply not present.	SL_FRU_NWS_PWR/0810	SL_EVT_NOT_PRESENT/9	High	Failed
Temperature	Ethernet switch not present	FRU_NWS_TEMP/0808	SL_EVT_NOT_PRESENT/9	High	Failed
	Ethernet switch under temperature	FRU_NWS_TEMP/0808	SL_EVT_UNDERTEMP/35	Middle	Warning
	Ethernet switch over temperature	FRU_NWS_TEMP/0808	SL_EVT_OVERTEMP/36	High	Failed
	Ethernet switch hardware fault	FRU_NWS_TEMP/0808	SL_EVT_HW_FAULT/7	High	Failed

Table 5 Network Interface Card Events

Sub-system	Event Description	FRU-ID/Code	Event-ID	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Ethernet port	Ethernet port not present	SL_FRU_NIC_ETHER_PORT/0116	SL_EVT_NOT_PRESEN T/9	High	Failed

Table 6 Fibre Channel Switch Events (DXi8500 Only)

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Chassis	Removed	SL_FRU_FCS/0201	SL_EVT_NOT_PRESEN T/9	High	Failed
	Invalid	SL_FRU_FCS/0201	SL_EVT_HW_FAULT/ 7	High	Failed
Communication	FC communication failure		SL_EVT_COMM_FC_FAIL/28		Failed
Control Processor (CP)	Removed	SL_FRU_FCS_CP/0205	SL_EVT_NOT_PRESEN T/9	High	Failed
	Invalid	SL_FRU_FCS_CP/0205	SL_EVT_HW_FAULT/ 7	High	Failed



<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert</b> (High, Middle, Low)	<b>State</b> (Failed, Degraded, Warning, Info, Good)
Fan	Absent	SL_FRU_FCS_FAN/0203	SL_EVT_NOT_PRESENT/9	High	Failed
	Below minimal	SL_FRU_FCS_FAN/0203	SL_EVT_FAN_LOW_SPEED/18	Middle	Warning
	Above maximum	SL_FRU_FCS_FAN/0203	SL_EVT_FAN_HIGH_SPEED/97	High	Failed
	Failed	SL_FRU_FCS_FAN/0203	SL_EVT_FAN_FAIL/19	High	Failed
General	Cold/warm start	SL_FRU_FCS/0201	SL_EVT_REBOOT/106	Middle	Warning
	Licence required	SL_FRU_FCS/0201	SL_EVT_LICENSE_FAIL/72	High	Failed
	Switch is unavailable (FC link broken)	SL_FRU_FCS/0201	SL_EVT_LINK_FAIL/14	High	Failed
	Switch management is broken	SL_FRU_FCS/0201	SL_EVT_COMM_FAIL/25	High	Failed
	Invalid configuration (connection, zones)	SL_FRU_FCS/0201	SL_EVT_BADCFG_FC_PORT/43	High	Failed
	Wrong firmware level	SL_FRU_FCS/0201	SL_EVT_WRONG_FW_LEVEL/30	High	Failed
	SFP is down	SL_FRU_FCS/0201	SL_EVT_NOT_PRESENT/9	High	Failed

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Power Supply	Absent	SL_FRU_FCS_PWR/0202	SL_EVT_NOT_PRESENT/9	High	Failed
	Below minimal	SL_FRU_FCS_PWR/0202	SL_EVT_UNDERVOLTAGE/11	Middle	Warning
	Above maximum	SL_FRU_FCS_PWR/0202	SL_EVT_OVERVOLTAGE/10	High	Failed
	Failed	SL_FRU_FCS_PWR/0202	SL_EVT_PWR_FAIL/17	High	Failed
SFP		SL_FRU_FCS_SFP/0204			
Switchnode	Removed	SL_FRU_FCS_SB/0206	SL_EVT_NOT_PRESENT/9	High	Failed
	Invalid	SL_FRU_FCS_SB/0206	SL_EVT_HW_FAULT/7	High	Failed
Temperature Sensor	Absent	SL_FRU_FCS_TEMP/0208	SL_EVT_NOT_PRESENT/9	High	Failed
	Below minimal	SL_FRU_FCS_TEMP/0208	SL_EVT_UNDERTEMP/35	Middle	Warning
	Above maximum	SL_FRU_FCS_TEMP/0208	SL_EVT_OVERTEMP/36	High	Degraded
	Failed	SL_FRU_FCS_TEMP/0208	SL_EVT_HW_FAULT/7	High	Failed
WWN	Removed	SL_FRU_FCS_WWN/0207	SL_EVT_NOT_PRESENT/9	High	Failed
	Invalid	SL_FRU_FCS_WWN/0207	SL_EVT_HW_FAULT/7	High	Failed

Table 7 Fibre Channel HBA Events (DXi6500, Model 6540 and 6550, DXi6700, DXi6800, and DXi8500 only)

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
Device mapper connection	Multi-path is broken	SL_FRU_IOS_FC_HBA/0118		High	Failed
Device connection	Path is broken	SL_FRU_IOS_FC_HBA/0118	SL_EVT_LINK_FAIL/14	High	Failed
Hotplug	Absent	SL_FRU_IOS_FC_HBA/0118	SL_EVT_NOT_PRESENT/9	High	Failed
	Failed	SL_FRU_IOS_FC_HBA/0118	SL_EVT_HW_FAULT/7	High	Failed
	SCSI device unavailable	SL_FRU_IOS_FC_HBA_DEVICE/0118	SL_EVT_NOT_PRESENT/9	High	Failed

Table 8 Software Events

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
NDMP	License is required	SL_FRU_DXI_SOFTWARE/0804	SL_EVT_LICENSE_REQUIRED/80	High	Failed
	License failed	SL_FRU_DXI_SOFTWARE/0804	SL_EVT_LICENSE_FAIL/72	High	Failed

<b>Sub-system</b>	<b>Event Description</b>	<b>FRU-ID/Code</b>	<b>Event-ID/Code</b>	<b>Alert (High, Middle, Low)</b>	<b>State (Failed, Degraded, Warning, Info, Good)</b>
NAS	Operation failure	SL_FRU_NAS_SERVICES/0119	SL_EVT_OP_FAIL/51	High	Failed
	Delayed	SL_FRU_NAS_SERVICES/0119	SL_EVT_DELAYED/131	High	Informational
SNFS	LUN communication failure	SL_FRU_SNFS/010D	SL_EVT_COMM_LUN_FAIL/48	High	Failed
	Filesystem not found	SL_FRU_SNFS/010D	SL_EVT_FILESYS_NOT_PRESENT/70	High	Failed
	Label validation failure	SL_FRU_SNFS/010D	SL_EVT_INVALID_LABEL/82	High	Degraded
	System resource failure	SL_FRU_SNFS/010D	SL_EVT_SYS_RESOURCE_FAIL/2	High	Warning
	Communication failure	SL_FRU_SNFS/010D	SL_EVT_COMM_FAILURE/25	Middle	Warning
	LUN mapping changed	SL_FRU_SNFS/010D	SL_EVT_LUN_CHANGE/88	Low	Warning
	IO Error	SL_FRU_SNFS/010D	SL_EVT_IO_ERR/24	High	Warning
	Configuration not supported	SL_FRU_SNFS/010D	SL_EVT_BADCFG_NOT_SUP/41	High	Failed
	Failed to allocate disk space	SL_FRU_SNFS/010D	SL_EVT_DISK_ALLOC_FAIL/89	High	Failed
	Metadata error	SL_FRU_SNFS/010D	SL_EVT_META_ERR/90	High	Warning
	Journaling error	SL_FRU_SNFS/010D	SL_EVT_JOURNAL_ERROR/91	High	Failed
Connection rejected	SL_FRU_SNFS/010D	SL_EVT_CONNECTION_FAIL/93	High	Degraded	

Sub-system	Event Description	FRU-ID/Code	Event-ID/Code	Alert (High, Middle, Low)	State (Failed, Degraded, Warning, Info, Good)
SNFS	Missing LUNs	SL_FRU_SNFS/010D	SL_EVT_LUN_NOT_FOUND/94	High	Failed
	Initialization failure	SL_FRU_SNFS/010D	SL_EVT_INITIALIZATION_FAIL/78	High	Failed
	Server not responding	SL_FRU_SNFS/010D	SL_EVT_NO_RESPONSE/52	High	Failed
Software	Metadump failed	SL_FRU_BLOCKPOOL/0802	SL_EVT_OP_FAIL/51	High	Failed
	Namespace replication failed	SL_FRU_BLOCKPOOL/0802	SL_EVT_REPL_FAIL/108	High	Failed
	Replication paused by system	SL_FRU_BLOCKPOOL/0802	SL_EVT_REPL_PAUSE/109	High	Failed
	Replication qbfs failure	SL_FRU_BLOCKPOOL/0802	SL_EVT_REPL_QBFS_FAIL/110	High	Failed
	Emergency truncation activated		SL_EVT_EMERG_TRUNCATION/68	Middle	Warning
	Process/Task died (not restarted)	SL_FRU_SNFS/010D	SL_EVT_TASK_DIED/1	High	Failed
	Performance degraded	SL_FRU_SNFS/010D	SL_EVT_PERF_DEGRADED/50	High	Degraded
	SL_EVT_NO_RESPONSE	SL_FRU_SNFS/010D	Not responding	High	Failed
Space Management	Ingest Throttled to slow IO	SL_FRU_SPACE_MGR/0807	SL_EVT_THROTTLE/112	Middle	Warning
	Stop IO due to no space	SL_FRU_SPACE_MGR/0807	SL_EVT_NOSPACE/113	High	Failed

