BROADCOM®

Brocade® Fabric OS® MIB Reference Manual, 8.2.x

Reference Manual
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Chapter 1: Introduction

1.1 About This Document

This document provides information on MIBs and the management information base (MIB) objects that are supported by Brocade® Fabric OS® software.

1.2 Supported Hardware and Software

The following hardware platforms are supported by Brocade Fabric OS 8.2.x

1.2.1 Brocade Gen 5 (16Gb/s) Fixed-Port Switches

- Brocade 6505 Switch
- Brocade 6510 Switch
- Brocade 6520 Switch
- Brocade 6505 blade server SAN I/O module
- Brocade 6543 blade server SAN I/O module
- Brocade 6545 blade server SAN I/O module
- Brocade 6546 blade server SAN I/O module
- Brocade 6547 blade server SAN I/O module
- Brocade 6548 blade server SAN I/O module
- Brocade 7840 Extension Switch

1.2.2 Brocade Gen 5 (16Gb/s) DCX Directors

NOTE: For ease of reference, Brocade chassis-based storage systems are standardizing on the term *director.* The legacy term *backbone* can be used interchangeably with the term *director.*

- Brocade DCX 8510-4 Director
- Brocade DCX 8510-8 Director

1.2.3 Brocade Gen 6 (32Gb/s) Fixed-Port Switches

- Brocade G610 Switch
- Brocade G620 Switch
- Brocade G630 Switch
- Brocade 7810 Extension Switch

1.2.4 Brocade Gen 6 (32Gb/s) X6 Directors

- Brocade X6-4 Director
- Brocade X6-8 Director

1.3 Contacting Technical Support for Your Brocade® Product

For product support information and the latest information on contacting the Technical Assistance Center, go to https://www.broadcom.com/support/fibre-channel-networking/. If you have purchased Brocade® product support directly from Broadcom, use one of the following methods to contact the Technical Assistance Center 24x7.

Online	Telephone
For nonurgent issues, the preferred method is to log in to myBroadcom at https://www.broadcom.com/mybroadcom. (You must initially register to gain access to the Customer Support Portal.) Once there, select **Customer Support Portal > Support Portal**. You will now be able to navigate to the following sites: ■ **Knowledge Search**: Clicking the top-right magnifying glass brings up a search bar. ■ **Case Management**: The legacy MyBrocade case management tool (MyCases) has been replaced with the Fibre Channel Networking case management tool. ■ **DocSafe**: You can download software and documentation. ■ **Other Resources**: Licensing Portal (top), SAN Health (top and bottom), Communities (top), Education (top).	Required for Severity 1 (critical) issues: Please call Fibre Channel Networking Global Support at one of the numbers listed at /.https://www.broadcom.com/support/fibre-channelnetworking

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■ Broadcom provides backline support for issues that cannot be resolved by the OEM/solution provider.

■ Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Broadcom or your OEM.

■ For questions regarding service levels and response times, contact your OEM/solution provider.

1.4 Document Feedback

Quality is our first concern. We have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission or if you think that a topic needs further development, we want to hear from you. Send your feedback to documentation.pdl@broadcom.com. Provide the publication title, publication number, topic heading, page number, and as much detail as possible.

Chapter 2: Understanding Brocade SNMP

2.1 Overview

Simple Network Management Protocol (SNMP) is a set of protocols for managing complex networks. SNMP protocols are application layer protocols. Using SNMP, devices within a network send messages, called protocol data units (PDUs), to different parts of the network. Network management using SNMP requires three components:

- SNMP manager
- SNMP agent
- Management information base (MIB)

2.1.1 SNMP Manager

The SNMP manager can communicate with the devices in a network using the SNMP protocol. Typically, SNMP managers are network management systems (NMSs) that manage networks by monitoring network parameters and, optionally, by setting parameters in managed devices. Normally, the SNMP manager sends read requests to the devices that host the SNMP agent; to which the SNMP agent then responds with the requested data. In some cases, the managed devices can initiate the communication and send data to the SNMP manager using asynchronous events called traps.

2.1.2 SNMP Agent

The SNMP agent is the software that resides in the managed devices in the network and collects data from these devices. Each device hosts an SNMP agent. The SNMP agent stores the data and sends it when requested by an SNMP manager. In addition, the agent can asynchronously alert the SNMP manager about events by using special PDUs called traps.

2.1.3 Management Information Base

SNMP agents in managed devices store data about these devices in a database called the management information base (MIB). The MIB is a hierarchical database that is structured on the standard specified in RFC 2578, *Structure of Management Information Version 2 (SMIv2)*.

The MIB is a database of objects that can be used by a network management system to manage and monitor devices on the network. The MIB can be retrieved by a network management system that uses SNMP. The MIB structure determines the scope of management access allowed by a device. By using SNMP, a manager application can issue read or write operations within the scope of the MIB.

2.2 Basic SNMP Operation

Every Brocade device carries an agent and a management information base (MIB). The agent accesses information about a device and makes it available to an SNMP network management station.

Figure 1: SNMP Structure
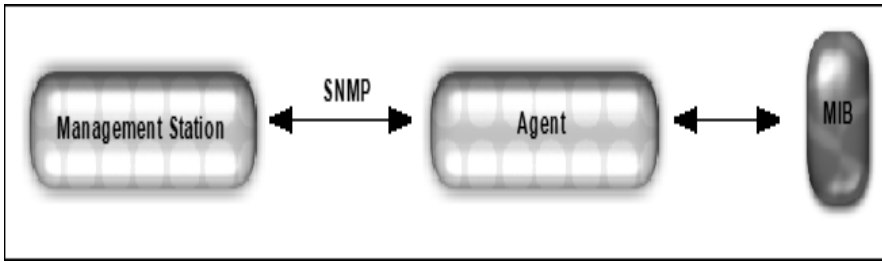
When active, the management station can get information or set information when it queries an agent. SNMP commands, such as `get, set`, `getnext`, and `getresponse`, are sent from the management station, and the agent replies once the value is obtained or modified. Agents use variables to report data such as the number of bytes and packets in and out of the device, or the number of broadcast messages sent and received. These variables are also known as managed objects. All managed objects are contained in the MIB.

Figure 2: SNMP Query
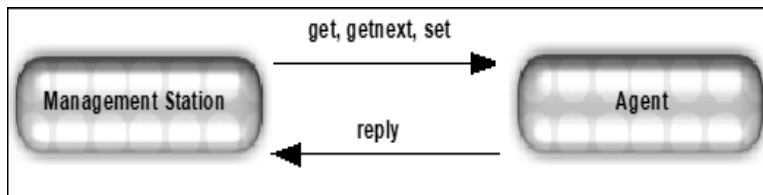
The management station can also receive traps, unsolicited messages from the switch agent if an unusual event occurs. For more information, see "Traps" on page 12.

Figure 3: SNMP Trap
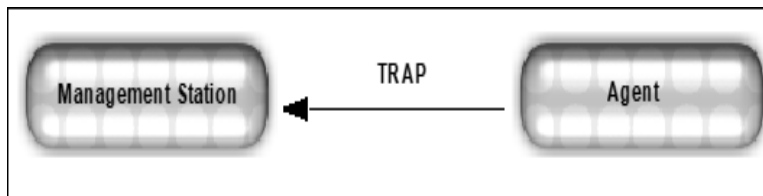
The agent can receive queries from one or more management stations and can send traps to up to six management stations.

2.3 Understanding MIBs

The management information base (MIB) is a database of monitored and managed information on a device, in this case a Brocade switch. The MIB structure can be represented by a tree hierarchy. The root splits into three main branches: International Organization for Standardization (ISO), Consultative Committee for International Telegraph and Telephone (CCITT), and joint ISO/CCITT. These branches have short text strings and integers (OIDs) to identify them. Text strings describe object names, while integers allow software to create compact, encoded representations of the names.

Each MIB variable is assigned an object identifier (OID). The OID is the sequence of numeric labels on the nodes along a path from the root to the object. For example, as shown in Figure 4, the Brocade SW.MIB OID is:

```
1.3.6.1.4.1.1588.2.1.1.1
```

The corresponding name is:

```
iso.org.dod.internet.private.enterprise.bcsi.commDev.fibreChannel.fcSwitch.sw
```

The other branches are part of the standard MIBs, and the portions relevant to configuring SNMP on a Brocade switch are referenced in the remainder of this reference.

Figure 4: Brocade MIB Tree Location
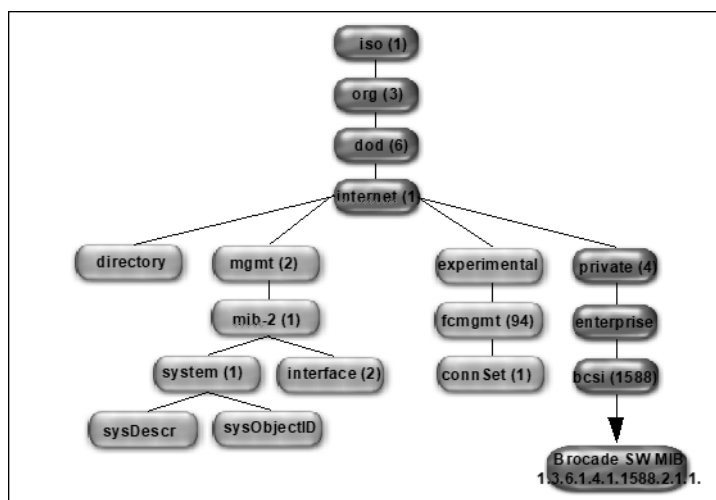
2.4 Access to MIB Variables

Use a MIB browser to access MIB variables. All MIB browsers perform queries and load MIBs.

Once loaded, the MAX-ACCESS provides access levels between the agent and management station. The access levels are as follows:

■ not accessible

You cannot read or write to this variable.

■ read create

This access level specifies a tabular object that can be read, modified, or created as a new row in a table.

■ read only - Public

You can only monitor information.

■ read-write - Private

You can read or modify this variable.

■ accessible-to-notify

You can read this information only through traps.

2.5 SNMP Support

In addition to the standard MIBs that Brocade devices support, these devices also support Brocade-specific MIBs. Since different vendors vary the information in their private enterprise MIBs, it is necessary to verify their information. The Fibre Channel MIB standards dictate that certain information be included in all MIBs; it is the vendors' responsibility to follow the standards. The standards are as follows:

- FibreAlliance (FA) MIB: Brocade supports Fabric OS 4.4.0 and later releases.
- Fabric Element (FE) MIB: This MIB is accepted by the Internet Engineering Task Force (IETF).

Brocade supports FE_RFC2837.mib under the MIB-II branch in Fabric OS 6.0.0 and later releases. The latest version of the FE MIB references the FRAMEWORK.MIB, and, based on the MIB browser, it is necessary to load this MIB before the FE.MIB.

For more information, see

2.6 Traps

An unsolicited message that comes to the management station from the SNMP agent on the device is called a trap. Brocade switches send traps out on UDP port 162 and to any configured port. In order to receive traps, the management station IP address and severity level must be configured on the switch. You can define a different message severity level for each recipient so that some recipients receive all trap messages and others receive only the most critical messages.

NOTE: Due to design limitations, IP address validation cannot be done for trap recipients.

There are two main MIB trap choices:

- FibreAlliance MIB trap: Associated with the Fibre Alliance MIB (FA-MIB), this MIB manages SAN switches and devices from any company that complies with Fibre Alliance specifications.
- Brocade-specific MIB trap: This MIB trap choice is associated with the Brocade-specific Brocade MIB (SW-MIB), manages Brocade switches only.

There is some overlap in the functionality of these MIBs. If you enable both SW-MIB and FA-MIB traps, you could receive duplicate messages for the switch events that trigger the trap.

You can also use the following additional MIBs and their associated traps, HA-MIB, FICON-MIB, and SWEXTTRAP.

In Fabric OS 7.4.0 and later, you can use the `snmpConfig` command to enable or disable all the MIBs.

An event trap (swEventTrap, connUnitEventTrap, or swFabricWatchTrap) is basically an error message (`errShow` output) that is SNMP-formatted and delivered.

2.6.1 FA Traps

Consider enabling the FA traps if you want to use SNMP to monitor multiple connectivity units, including Brocade switches.

The `switchStatusPolicySet` command determines the FA-TRAP switch status-related outputs:
- connUnitStatusChange: This trap is generated by Fabric Watch such that only the swUnitsStatusChange is controlled by the `switchStatusPolicySet` command.
- connUnitPortStatusChange: This trap sends the instance of connUnitPortName as part of the trap; the instance string is NULL, if the port name is not defined for the specified port.
- connUnitEventTrap: All the external traps are converted into swEventTrap except for AN-1006, AUTH-3001 to AUTH-3008, FW-3001, SEC-3001 to SEC-3034, and SEC-3044 to SEC-3048 RASLog messages.

Events in the error log of a severity at or above the configured threshold will generate SNMP traps.

The Fibre Alliance Trap (FA-TRAP) can be configured to send traps using the `snmpConfig` command. For more information on this command, refer to the *Brocade Fabric OS Command Reference Manual*.

2.6.2 HA Traps

Consider enabling these traps to monitor field-replaceable unit (FRU) status and control processor (CP) status when you have a Brocade director in your environment:

- fruStatusChanged: This trap is generated by an FRU status change, such as a switch reboot or disabling or enabling an FRU component such as fandisable and fanenable.
- cpStatusChanged: This trap is generated by a change in the status of a CP, including a reboot or firmware download.
- fruHistoryTrap: This trap is generated when an FRU is added or removed. It is not generated when a standby CP is removed.

The high availability trap (HA-TRAP) can be configured to send traps using the `snmpConfig` command. For more information on this command, refer to the *Brocade Fabric OS Command Reference Manual.*

2.6.3 SW Traps

The Brocade SW-TRAP trap can be configured to send traps using the `snmpConfig` command.

The following is the list of specific traps defined in Brocade SW-TRAP.

- swFCPortScn: This trap is generated by a port state change.
- swEventTrap: This trap is generated by any switch event reported to the system error log. The desired severity level is introduced to filter a swEvent trap based on the severity level.
- swIPv6ChangeTrap: This trap is generated when an IPv6 address status change event occurs. It is generated only when the IPv6 stateless state changes to the deprecation state and not for address change notification.
- swPmgrEventTrap: This trap is generated when any partition manager change happens.
- swFabricReconfigTrap: This trap is sent for tracking fabric reconfiguration.
- swFabricSegmentTrap: This trap is sent for tracking segmentation.
- swExtTrap: This trap adds the SSN binding to the traps if it is enabled.
- swStateChangeTrap: This trap is sent when the switch changes its state to online or offline.
- swPortMoveTrap: This trap is sent when the virtual ports are moved from one switch to another.
- swBrcdGenericTrap: This trap is sent for the following events. This trap is for Brocade use.
  - Routing policy change
  - Diagnostics port configuration change
  - Polling status
  - Dynamic port name change
  - Dynamic Port Name feature enable/disable event
- swDeviceStatusTrap: This trap is sent whenever a device logs in or logs out.
- swZoneConfigChangeTrap: This trap is sent whenever there is change in the local zone database.

2.6.4 FICON Traps

- linkRNIDDeviceRegistration: A device registered with the switch.
- linkRNIDDeviceDeRegistration: A device deregistered with the switch.
- linkLIRRListenerAdded: A listener for a link failure incident is added.
- linkLIRRListenerRemoved: A listener for a link failure incident is removed.

- linkRLIRFailureIncident: A link failure incident has occurred.

2.6.5 IF Traps

- linkDown: A linkDown trap signifies that the SNMPv2 entity acting in an agent role has detected that the ifOperStatus object for one of its communication links is about to transition into the down state.
- linkUp: A linkUp trap signifies that the SNMPv2 entity acting in an agent role has detected that the ifOperStatus object for one of its communication links has transitioned out of the down state.

2.6.6 MAPS Traps

Consider enabling the MAPS traps if you want to use SNMP to monitor Brocade switches.

- mapsTrapAM: Alerting and Monitoring traps to be sent for Monitoring and Alerting Policy Suite (MAPS) threshold events.
- mapsQuietTimeTrap: Traps to be sent for MAPS threshold events upon QuietTime expiration.

2.7 Loading Brocade MIBs

The Brocade MIBs are set of variables that are private extensions to the Internet standard MIB-II. The Brocade agents support many other Internet-standard MIBs. These standard MIBs are defined in *RFC* publications. To find specific MIB information, examine the Brocade proprietary MIB structure and the standard *RFC* MIBs supported by Brocade.

2.7.1 Brocade MIB Files

The Brocade MIB files are as follows:

- bcCustomOperation.mib
- BRCD_REG.mib
- BRCD_TC.mib
- brcdfcip.mib
- BROCADE-MAPS-MIB.mib
- CPQ_HOST.mib (supported only on the HP VC 8Gb 24-Port FC Module)
- CPQ_RACK.mib (supported only on the HP VC 8Gb 24-Port FC Module)
- FA.mib
- faext.mib
- FICON.mib
- fod.mib (supported only on the BR 6547 Embedded Switch)
- HA.mib
- IbmBladeCenter.mib (supported only on the BR 6547 Embedded Switch)
- SW.mib

2.7.2 Standard MIBs

Distribution of standard MIBs was discontinued starting with Fabric OS 6.4.0. You can download the following MIBs from the http://www.oidview.com/ or http://www.mibdepot.com websites:

- ENTITY-MIB
- FC-MGMT-MIB
- FCIP-MGMT-MIB

- FIBRE-CHANNEL-FE-MIB
- IANAifType-MIB
- IF-MIB
- INET-ADDRESS-MIB
- IP MIB
- RFC1155-SMI
- RFC1158-MIB
- RFC-1212
- RFC1213-MIB
- RFC-1215
- SNMP-COMMUNITY-MIB
- SNMP-FRAMEWORK-MIB
- SNMP-VIEW-BASED-ACM-MIB
- SNMP-USER-BASED-SM-MIB
- SNMP-TARGET-MIB
- SNMPv2-CONF
- SNMPv2-MIB
- SNMPv2-PARTY-MIB
- SNMPv2-SMI-MIB
- SNMPv2-TC
- T11-FC-ZONE-SERVER-MIB (This is a Brocade proprietary MIB. This MIB contains the following traps: t11ZsRequestRejectNotify, t11ZsMergeFailureNotify, t11ZsMergeSuccessNotify, t11ZsDefZoneChangeNotify, and t11ZsActivateNotify.)

2.7.3 MIB Loading Order

Many MIBs use definitions that are defined in other MIBs. These definitions are listed in the IMPORTS section near the top of the MIB. When loading the Brocade MIBs, refer to the following table to ensure that any MIB dependencies load in the correct order.

Before loading Brocade MIB files, ensure that you have the correct version of SNMP for your Fabric OS version. All versions of Fabric OS support SNMPv1 and SNMPv3. All versions of Fabric OS support SNMPv2c, but do not support trap/inform.

The following table list the Brocade SNMP MIB dependencies

.
Table 1: Brocade SNMP MIB Dependencies

MIB Name	Dependencies
BRCD_REG.mib	RFC1155-SMI
BRCD_TC.mib	Brocade-REG-MIB SNMPv2-TC SNMPv2-SMI

Table 1: Brocade SNMP MIB Dependencies (Continued)

MIB Name	Dependencies
FC-MGMT-MIB	SNMPv2-SMI SNMPv2-CONF SNMPv2-MIB IANAifType-MIB SNMPv2-TC IF-MIB SNMP-FRAMEWORK-MIB
FA.mib	RFC1155-SMI RFC1158-MIB RFC-1212 RFC1213-MIB RFC-1215
FIBRE-CHANNEL-FE-MIB	SNMPv2-SMI SNMPv2-TC SNMP-FRAMEWORK-MIB SNMPv2-CONF
FCIP-MGMT-MIB	SNMPv2-SMI SNMPv2-TC INET-ADDRESS-MIB FC-MGMT-MIB IF-MIB SNMPv2-CONF SNMP-FRAMEWORK-MIB
ENTITY-MIB	SNMPv2-SMI SNMPv2-TC SNMPv2-CONF SNMP-FRAMEWORK-MIB
SW.mib	SNMPv2-TC SNMPv2-SMI Brocade-TC Brocade-REG-MIB FCMGMT-MIB
brcdfcip.mib	SNMPv2-SMI Brocade-REG-MIB SNMPv2-TC INET-ADDRESS-MIB IF-MIB SNMPv2-CONF
faext.mib	SNMPv2-TC SNMPv2-SMI SW-MIB FCMGMT-MIB

Table 1: Brocade SNMP MIB Dependencies (Continued)

MIB Name	Dependencies
FICON.mib	SNMPv2-SMI SNMPv2-TC Brocade-REG-MIB
HA.mib	SNMPv2-SMI Brocade-REG-MIB SW-MIB ENTITY-MIB SNMPv2-TC
BROCADE-MAPS-MIB	SNMPv2-SMI Brocade-REG-MIB SW-MIB

2.7.4 Access Gateway and Brocade MIBs

The following table shows the MIBs supported by Brocade Access Gateway

.
Table 2: Access Gateway MIB Support

MIB Name	Description
MIB-2	Supported in Fabric OS 5.2.1 and later releases.
Entity-MIB	Supported.
HA-MIB	Supported.
SW-MIB	Disabled in Access Gateway because the conventions are specific to fabric switches. In Fabric OS 7.0.0, SNMP allows you to access the following tables in Access Gateway, even if the SW-MIB is disabled: ■ ""swConnUnitPortStatExtentionTable" and "swSfpStatTable" (Supported in Fabric OS 7.0.0 and later) ■ "swCpuOrMemoryUsage" (Supported in Fabric OS 8.1.0 and later)
FA-MIB	The connUnitSnsTable is not supported because switches in Access Gateway mode do support name server services.
CPQ-Rack MIB	Supported on the HP VC 8Gb 24-Port FC Module only.
IF-MIB	Supported.
FA-Ext	Supported.
SNMPv2 MIB	Supported.

2.8 Firmware Upgrades and Enabled Traps

You can turn on and off traps individually within a trap group. By default the individual traps are turned off even if the corresponding trap group was enabled before upgrading. You must use the `snmpconfig` command to turn on the individual traps within each trap group.

2.9 Support for Administrative Domains

In Fabric OS 8.0.1 and later, support for administration domains (ADs) is deprecated. A warning message is displayed and a RASLog entry is generated for any AD configuration commands or if an AD is activated through a command or zone merge.

2.10 Support for Role-Based Access Control

Role-Based Access Control (RBAC) is supported in Fabric OS 5.3.0 and later releases. RBAC applies a fixed set of roles that address the access control needs of a majority of customers. Each role is a set of permissions that can be applied to a user and that controls the kinds of jobs and tasks that the user can perform on a fabric or fabric element.

2.11 Support for IPv6 Addressing

IPv6 addressing is supported in Fabric OS 5.3.0 and later releases.

2.12 Support for Virtual Fabrics

The Virtual Fabric feature is supported in Fabric OS 6.2.0 and later releases.

NOTE: SNMPv3 must be used to manage a virtual fabric.

When an SNMPv3 request arrives with a particular user name, it executes in the home virtual fabric. From the SNMP manager, all SNMPv3 requests have a home virtual fabric that is specified in the contextName field. When the home virtual fabric is specified, it is then converted to the corresponding switch ID and the home virtual fabric is set. If you do not have permission for the specified home virtual fabric, this request will fail with an error code of noAccess.

For nondefault SNMPv3 user to have a home virtual fabric, a list of allowed virtual fabrics, an RBAC role, and the name of the SNMPv3 user must match those of the Fabric OS user in the local switch database. SNMPv3 users whose names do not match any of the existing Fabric OS local users are assigned a default RBAC role of "admin" with read and write permission. SNMPv3 user access control permissions. Their SNMPv3 user logs in with an access control of read-only. Both user types will have the default switch as their home virtual fabrics.

The contextName field should have the format "VF:xxx", where xxx is the actual VF_ID, for example "VF:1". If the contextName field is empty, the home virtual fabric of the local Fabric OS user with the same name is used. Because virtual fabrics and admin domains are mutually exclusive, this field is considered a virtual fabrics context when virtual fabrics is enabled. You cannot specify a chassis context in the contextName field.

The following example shows how the VF:xxx field is used in the `snmpwalk` command. This command is issued on the host, and it walks the specified MIB subtree.

```
switch# snmpwalk -v3 -a MD5 -A passpass -x AES128 -u admin1 -X passpass -n VF:4
10.20.8.17 1.3.6.1.4.1.1588.2.1.2.1.5.1 -l authPriv
```

NOTE: In Fabric OS 8.0.1, support for administration domains (ADs) is deprecated. A warning message is displayed and a RASLog entry is generated for any AD configuration commands or if an AD is activated through a command or zone merge.

2.12.1 Filtering Ports

Each port can belong to only one virtual fabric at any time. An SNMP request that comes to one virtual fabric can view only the port information of the ports that belong to that virtual fabric. All port attributes are filtered to allow SNMP to obtain the port information only from within the current virtual fabrics context.

2.12.2 Switch and Chassis Context Enforcement

All attributes are classified into one of two categories:
- Chassis-level attributes
- Switch-level attributes

Attributes that are specific to each logical switch belong to the switch category. These attributes are available in the virtual fabrics context and are not available in the chassis context.

Attributes that are common across the logical switches belong to the chassis level. These attributes are accessible to users that have the chassis-role permission. When a chassis table is queried, the context is set to the chassis context, if the user has the chassis-role permission. The context reverts to the original context after the operation is performed.

2.13 Customized Traps

This section is applicable to OEM customers. The Fabric OS 7.0.0 and 7.0.1 releases supported the addition of the system OID in the trap OID to customize the trap OID on different platforms. For example, the Fabric Watch customized trap OID is 1.3.6.1.4.1.1588.2.1.1.62.0.5 on the Brocade DCX and 1.3.6.1.4.1.1588.2.1.1.71.0.5 on the Brocade 5100. This feature is not supported in Fabric OS 7.1.0 and later releases.

2.14 Retries and Timeouts

Retries are the number of times that a request is sent from the application when a timeout occurs. The recommended value is 3; that is, the request is transmitted three times during a timeout.

Timeout is a period of time that an SNMP Manager waits for a response message from an agent. The recommended value is 5 seconds. If multiple OIDs are provided in a single request (for example, Get-Bulk operation) or if multiple requests are sent across slow network connections, the wait time must be increased to allow the SNMP agent to respond to the request.

A maximum of three clients are allowed, two for the Brocade SANnav™ Management Portal and Brocade SANnav™ Global View and one for the external SNMP application.

2.15 References

For procedures on configuring SNMP on Brocade switches, refer to the *Brocade Fabric OS Administration Guide.*

For information about SNMP commands, refer to the *Brocade Fabric OS Message Reference Manual*.

Chapter 3: Supported Standard MIBs

3.1 RFC 1213: MIB-II

3.1.1 Fully Supported or Deprecated Object Groups

The following groups from RFC 1213 are either fully supported or deprecated.

Object Group Name	OID	Supported?
system	1.3.6.1.2.1.1	Yes **NOTE:** All systems must implement the System group. If an agent is not configured to have a value for any of the System group variables, a string of length 0 is returned.
at	1.3.6.1.2.1.3	No **NOTE:** Implementation of the Address Translation group is mandatory for all systems. However, this group is deprecated by MIB-II. From MIB-II onward, each network protocol group contains its own address translation tables.
icmp	1.3.6.1.2.1.5	Yes **NOTE:** Implementation of the ICMP group is mandatory for all systems.
tcp	1.3.6.1.2.1.6	Yes **NOTE:** Implementation of the TCP group is mandatory for all systems that implement TCP. Instances of object types that represent information about a particular TCP connection are transient; they persist only as long as the connection in question.
udp	1.3.6.1.2.1.7	Yes **NOTE:** Implementation of the UDP group is mandatory for all systems that implement UDP.
egp	1.3.6.1.2.1.8	No

Object Group Name	OID	Supported?
transmission	1.3.6.1.2.1.10	No
snmp	snmp	Yes
		NOTE: Implementation of the SNMP group is mandatory for all systems that support an SNMP protocol entity. Some of the objects defined are zero-valued in those SNMP implementations that are optimized to support only those functions specific to either a management agent or a management station. All of the objects refer to an SNMP entity, and there might be several SNMP entities residing on a managed node (for example, if the node is acting as a management station). snmpInBadTypes and snmpOutReadOnlys are not supported.

3.1.2 Partially Supported Object Groups

The following groups from RFC 1213 are partially supported.

3.1.2.1 Interfaces Group

Implementation of the Interfaces group is mandatory for all systems. To support FCIP tunneling, entries are created in the ifTable for each WAN interface (GbE port), each FC port, and each FCIP tunnel (transport interface).

Object	OID	Supported?
ifNumber	1.3.6.1.2.1.2.1	Yes
ifTable	1.3.6.1.2.1.2.2	Yes
ifEntry	1.3.6.1.2.1.2.2.1	Yes
ifIndex[a]	1.3.6.1.2.1.2.2.1.1	Yes
ifDescr[1]	1.3.6.1.2.1.2.2.1.2	Yes
ifType[1]	1.3.6.1.2.1.2.2.1.3	Yes
ifMtu[1]	1.3.6.1.2.1.2.2.1.4	Yes
ifSpeed[1]	1.3.6.1.2.1.2.2.1.5	Yes
ifPhysAddress[1]	1.3.6.1.2.1.2.2.1.6	Yes
ifAdminStatus	1.3.6.1.2.1.2.2.1.7	Yes
ifOperStatus	1.3.6.1.2.1.2.2.1.8	Yes
ifLastChange	1.3.6.1.2.1.2.2.1.9	Yes
ifInOctets[b]	1.3.6.1.2.1.2.2.1.10	Yes
ifInUcastPkts[2]	1.3.6.1.2.1.2.2.1.11	No
ifInNUcastPkts	1.3.6.1.2.1.2.2.1.12	No

Object	OID	Supported?
ifInDiscards[c]	1.3.6.1.2.1.2.2.1.13	Yes
ifInErrors[3]	1.3.6.1.2.1.2.2.1.14	Yes
ifInUnknownProtos[3]	1.3.6.1.2.1.2.2.1.15	No
ifOutOctets[2]	1.3.6.1.2.1.2.2.1.16	Yes
ifOutUcastPkts[2]	1.3.6.1.2.1.2.2.1.17	No
ifOutNUcastPkts	1.3.6.1.2.1.2.2.1.18	No
ifOutDiscards[3]	1.3.6.1.2.1.2.2.1.19	Yes
ifOutErrors[3]	1.3.6.1.2.1.2.2.1.20	Yes
ifOutQLen	1.3.6.1.2.1.2.2.1.21	No
ifSpecific	1.3.6.1.2.1.2.2.1.22	Yes

a.   FCoE Support - The object value changes based on the port type.

b.   FCoE Support - This is applicable for both FC and Ethernet port types.

c.   FCoE Support - This is applicable for the Ethernet port type only.

3.1.2.2 IP Group

Implementation of the IP group is mandatory for all systems.

Object	OID	Supported?
ipForwarding	1.3.6.1.2.1.4.1	Yes
ipDefaultTTL	1.3.6.1.2.1.4.2	Yes
ipInReceives	1.3.6.1.2.1.4.3	Yes
ipInHdrErrors	1.3.6.1.2.1.4.4	Yes
ipInAddrErrors	1.3.6.1.2.1.4.5	Yes
ipForwDatagrams	1.3.6.1.2.1.4.6	Yes
ipInUnknownProtos	1.3.6.1.2.1.4.7	Yes
ipInDiscards	1.3.6.1.2.1.4.8	Yes
ipInDelivers	1.3.6.1.2.1.4.9	Yes
ipOutRequests	1.3.6.1.2.1.4.10	Yes
ipOutDiscards	1.3.6.1.2.1.4.11	Yes
ipOutNoRoutes	1.3.6.1.2.1.4.12	Yes
ipReasmTimeout	1.3.6.1.2.1.4.13	Yes
ipReasmReqds	1.3.6.1.2.1.4.14	Yes
ipReasmOKs	1.3.6.1.2.1.4.15	Yes
ipReasmFails	1.3.6.1.2.1.4.16	Yes
ipFragOKs	1.3.6.1.2.1.4.17	Yes

Object	OID	Supported?
ipFragFails	1.3.6.1.2.1.4.18	Yes
ipFragCreates	1.3.6.1.2.1.4.19	Yes
ipAddrTable	1.3.6.1.2.1.4.20	Yes
ipAddrEntry	1.3.6.1.2.1.4.20.1	Yes
ipAdEntAddr	1.3.6.1.2.1.4.20.1.1	Yes
ipAdEntIfIndex	1.3.6.1.2.1.4.20.1.2	Yes
ipAdEntNetMask	1.3.6.1.2.1.4.20.1.3	Yes
ipAdEntBcastAddr	1.3.6.1.2.1.4.20.1.4	Yes
ipAdEntReasmMaxSize	1.3.6.1.2.1.4.20.1.5	No
ipRouteTable	1.3.6.1.2.1.4.21	Yes
ipRouteEntry	1.3.6.1.2.1.4.21.1	Yes
ipRouteDest	1.3.6.1.2.1.4.21.1.1	Yes
ipRouteIfIndex	1.3.6.1.2.1.4.21.1.2	Yes
ipRouteMetric1	1.3.6.1.2.1.4.21.1.3	Yes
ipRouteMetric2	1.3.6.1.2.1.4.21.1.4	Yes
ipRouteMetric3	1.3.6.1.2.1.4.21.1.5	Yes
ipRouteMetric4	1.3.6.1.2.1.4.21.1.6	Yes
ipRouteNextHop	1.3.6.1.2.1.4.21.1.7	Yes
ipRouteType	1.3.6.1.2.1.4.21.1.8	Yes
ipRouteProto	1.3.6.1.2.1.4.21.1.9	Yes
ipRouteAge	1.3.6.1.2.1.4.21.1.10	No
ipRouteMask	1.3.6.1.2.1.4.21.1.11	Yes
ipRouteMetric5	1.3.6.1.2.1.4.21.1.12	Yes
ipRouteInfo	1.3.6.1.2.1.4.21.1.13	Yes
ipNetToMediaTable	1.3.6.1.2.1.4.22	Yes
ipNetToMediaEntry	1.3.6.1.2.1.4.22.1	Yes
ipNetToMediaIfIndex	1.3.6.1.2.1.4.22.1.1	Yes
ipNetToMediaPhysAddress	1.3.6.1.2.1.4.22.1.2	Yes
ipNetToMediaNetAddress	1.3.6.1.2.1.4.22.1.3	Yes
ipNetToMediaType	1.3.6.1.2.1.4.22.1.4	Yes
ipRoutingDiscards	1.3.6.1.2.1.4.23	No
ipAddressTable	1.3.6.1.2.1.4.34	Yes
ipAddressEntry	1.3.6.1.2.1.4.34.1	Yes
ipAddressAddrType	1.3.6.1.2.1.4.34.1.1	Yes
ipAddressAddr	1.3.6.1.2.1.4.34.1.2	Yes

Object	OID	Supported?
ipAddressIfIndex	1.3.6.1.2.1.4.34.1.3	Yes
ipAddressType	1.3.6.1.2.1.4.34.1.4	Yes
ipAddressPrefix	1.3.6.1.2.1.4.34.1.5	Yes
ipAddressOrigin	1.3.6.1.2.1.4.34.1.6	Yes
ipAddressStatus	1.3.6.1.2.1.4.34.1.7	Yes
ipAddressCreated	1.3.6.1.2.1.4.34.1.8	Yes
ipAddressLastChanged	1.3.6.1.2.1.4.34.1.9	Yes
ipAddressRowStatus	1.3.6.1.2.1.4.34.1.10	Yes
ipAddressStorageType	1.3.6.1.2.1.4.34.1.11	Yes

3.1.2.3 ifMIB Group

The ifMIB group supports FCIP tunnels. There are entries in the ifXTable for each WAN interface (GbE port), each FC port, and each FCIP tunnel (transport interface). The ifXtable is used to support 64-bit FC statistics counters.

For FC ports, the broadcast packets value of an unsupported object returns the value 0, but the same object is supported on FCIP ports. The following table lists the IfMIB group objects.

Object	OID	Supported?
ifXTable	1.3.6.1.2.1.31.1.1	Yes
ifXentry	1.3.6.1.2.1.31.1.1.1	Yes
ifName[a]	1.3.6.1.2.1.31.1.1.1.1	Yes
ifInMulticastPkts[b]	1.3.6.1.2.1.31.1.1.1.2	No
ifInBroadcastPkts[2]	1.3.6.1.2.1.31.1.1.1.3	No
ifOutMulticastPkts[2]	1.3.6.1.2.1.31.1.1.1.4	No
ifOutBroadcastPkts[2]	1.3.6.1.2.1.31.1.1.1.5	No **NOTE:** This object is supported only on FCIP interfaces.
ifHCInOctets[c]	1.3.6.1.2.1.31.1.1.1.6	Yes
ifHCInUcastPkts[3]	1.3.6.1.2.1.31.1.1.1.7	Yes
ifHCInMulticastPkts[2]	1.3.6.1.2.1.31.1.1.1.8	No
ifHCInBroadcastPkts[2]	1.3.6.1.2.1.31.1.1.1.9	No
ifHCOutOctets[3]	1.3.6.1.2.1.31.1.1.1.10	Yes
ifHCOutUcastPkts[3]	1.3.6.1.2.1.31.1.1.1.11	Yes
ifHCOutMulticastPkts[2]	1.3.6.1.2.1.31.1.1.1.12	No
ifHCOutBroadcastPkts[2]	1.3.6.1.2.1.31.1.1.1.13	No

Object	OID	Supported?
ifLinkUpDownTrapEnable[3]	1.3.6.1.2.1.31.1.1.1.14	Yes **NOTE:** This object cannot be set and is read only.
ifHighSpeed[3]	1.3.6.1.2.1.31.1.1.1.15	Yes
ifPromiscuousMode[2]	1.3.6.1.2.1.31.1.1.1.16	Yes
ifConnectorPresent[3]	1.3.6.1.2.1.31.1.1.1.17	Yes
ifAlias	1.3.6.1.2.1.31.1.1.1.18	No
ifCounterDiscontinuityTime	1.3.6.1.2.1.31.1.1.1.19	No

a.   FCoE support - The object value changes based on the port type.

b.   FCoE support - This is applicable for the Ethernet port type only.

c.   FCoE support - This is applicable for both FC and Ethernet port types.

3.2 RFC 4133: Entity MIB

The Entity MIB is the module for representing multiple logical entities supported by a single SNMP agent.

3.2.1 Textual Conventions for the Entity MIB

3.2.1.1 PhysicalIndex

An arbitrary value that uniquely identifies the physical entity. The value should be a small positive integer; index values for different physical entities are not necessarily contiguous.

Syntax:

Integer (1... 2147483647)

3.2.1.2 PhysicalClass

An enumerated value that provides an indication of the general hardware type of a particular physical entity. There are no restrictions as to the number of entPhysicalEntries of each entPhysicalClass, which must be instantiated by an agent.

Syntax:

Integer

The following are the possible values for PhysicalClass.

Values	Description
other (1)	The physical entity class is known but does not match any of the supported values.
unknown (2)	The physical entity class is unknown to the agent.
chassis (3)	The physical entity class is an overall container for networking equipment. Any class of physical entity except a stack can be contained within a chassis, and a chassis might be contained only within a stack.

Values	Description
backplane (4)	The physical entity class is a device for aggregating and forwarding networking traffic, such as a shared backplane in a modular Ethernet switch. Note that an agent might model a backplane as a single physical entity, which is actually implemented as multiple discrete physical components (within a chassis or stack).
container (5)	The physical entity class is capable of containing one ore more removable physical entities, possibly of different types (such as a chassis slot or daughtercard holder). For example, each (empty or full) slot in a chassis is modeled as a container. Note that all removable physical entities should be modeled within a container entity, such as field-replaceable modules, fans, or power supplies. Note that all known containers, including empty containers, should be modeled by the agent.
powerSupply (6)	The physical entity class is a power-supplying component.
fan (7)	The physical entity class is a fan or other heat-reduction component.
sensor (8)	The physical entity class is a sensor, such as a temperature sensor within a router chassis.
module (9)	The physical entity class is a self-contained subsystem (such as a plug-in card or daughtercard). If it is removable, it should be modeled within a container entity; otherwise, it should be modeled directly within another physical entity (for example, a chassis or another module).
port (10)	The physical entity class is a networking port, capable of receiving or transmitting networking traffic.
stack (11)	The physical entity class is a super-container (possibly virtual), intended to group multiple chassis entities (such as a stack of multiple chassis entities). A stack might be realized by a virtual cable or a real interconnect cable attached to multiple chassis, or it can comprise multiple interconnect cables. A stack should not be modeled within any other physical entities, but a stack might be contained within another stack. Only chassis entities should be contained within a stack.

3.2.1.3 SnmpEngineIdOrNone

A specially formatted SnmpEngineID string for use with the Entity MIB.

If an instance of an object with syntax SnmpEngineIdOrNone has a non-zero length, then the object encoding and semantics are defined by the SnmpEngineID textual convention. (Refer to RFC 2571 for details.)

If an instance of an object with syntax SnmpEngineIdOrNone contains a zero-length string, then no appropriate SnmpEngineID is associated with the logical entity (that is, SNMPv3 is not supported).

- For the Brocade 3016 or Brocade 4020 blades, the snmpEngineID takes the UUID value. For example, if the UUID value is A9914D56-1E5A-0E59-C51E-528802B06E4F, the snmpEngineID displays `80.00.06.34.B1.A9.91.4D.56.1E.5A.0E.59.C5.1E.52.88.02.B0.6E.4F (hex)`.
- For other switches, the snmpEngineID takes the WWN. For example, if the WWN value is 10:00:00:05:1e:35:d5:ee, the snmpEngineID displays `80.00.06.34.B2.10.00.00.05.1E.35.D5.EE (hex)`.
- If the WWN cannot be taken, the snmpEngineID takes the IP address plus the port number along with the private enterprise number and algorithm type used. An example of this type of snmpEngineID would be `00.00.06.34.00.00.00.A1.0A.20.93.CA (hex)`.

Syntax:

OCTET STRING (SIZE(0..32))   Empty string or SnmpEngineID

3.2.2 Fully Supported Object Group

The following group from RFC 4133 is fully supported.

3.2.2.1 Physical Entity Group

Object group name	OID	Supported?
entityPhysical	1.3.6.1.2.1.47.1.1	Yes
entPhysicalTable	1.3.6.1.2.1.47.1.1.1	Yes
entPhysicalEntry	1.3.6.1.2.1.47.1.1.1.1	Yes
entPhysicalIndex	1.3.6.1.2.1.47.1.1.1.1.1	Yes
entPhysicalDescr	1.3.6.1.2.1.47.1.1.1.1.2	Yes
entPhysicalVendorType	1.3.6.1.2.1.47.1.1.1.1.3	Yes
entPhysicalContainedIn	1.3.6.1.2.1.47.1.1.1.1.4	Yes
entPhysicalClass	1.3.6.1.2.1.47.1.1.1.1.5	Yes
entPhysicalParentRelPos	1.3.6.1.2.1.47.1.1.1.1.6	Yes
entPhysicalName	1.3.6.1.2.1.47.1.1.1.1.7	Yes
entPhysicalHardwareRev	1.3.6.1.2.1.47.1.1.1.1.8	Yes
entPhysicalFirmwareRev	1.3.6.1.2.1.47.1.1.1.1.9	Yes
entPhysicalSoftwareRev	1.3.6.1.2.1.47.1.1.1.1.10	Yes
entPhysicalSerialNum	1.3.6.1.2.1.47.1.1.1.1.11	Yes.
entPhysicalMfgName	1.3.6.1.2.1.47.1.1.1.1.12	Yes
entPhysicalModelName	1.3.6.1.2.1.47.1.1.1.1.13	Yes
entPhysicalAlias	1.3.6.1.2.1.47.1.1.1.1.14	Yes
entPhysicalAssetID	1.3.6.1.2.1.47.1.1.1.1.15	Yes
entPhysicalIsFRU	1.3.6.1.2.1.47.1.1.1.1.16	Yes

The following figure shows the entPhysicalTable containment hierarchy (entPhysicalContainsTable).
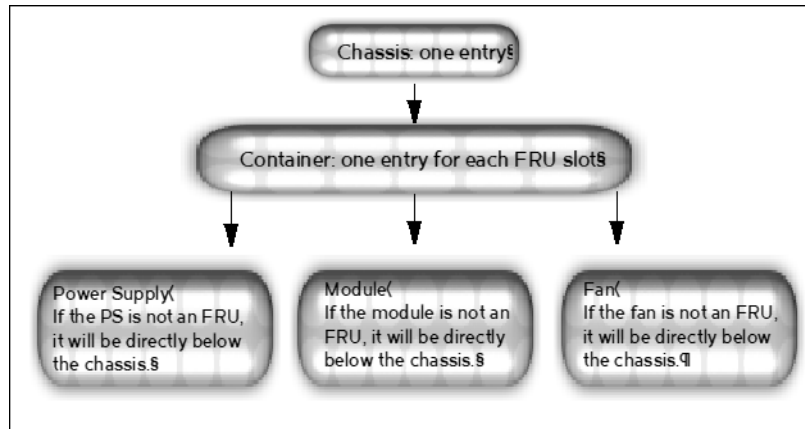
3.2.3 Unsupported Object Groups

The following groups from RFC 4133 are not supported.

Object Group Name	OID	Supported?
entLogical	1.3.6.1.2.1.47.1.2	No
entityMapping	1.3.6.1.2.1.47.1.3	No
entityGeneral	1.3.6.1.2.1.47.1.4	No

3.2.4 Partially Supported Object Groups

The following groups from RFC 4133 are partially supported.

Object Group Name	OID	Supported?
entityCompliance	1.3.6.1.2.1.47.3.1.1	No
entity2Compliance	1.3.6.1.2.1.47.3.1.2	Yes
entityPhysicalGroup	1.3.6.1.2.1.47.3.2.1	Yes
entityLogicalGroup	1.3.6.1.2.1.47.3.2.2	No
entityMappingGroup	1.3.6.1.2.1.47.3.2.3	Yes
entityGeneralGroup	1.3.6.1.2.1.47.3.2.4	Yes
entityNotificationsGroup	1.3.6.1.2.1.47.3.2.5	Yes
entityPhysical2Group	1.3.6.1.2.1.47.3.2.6	Yes
entityLogical2Group	1.3.6.1.2.1.47.3.2.7	Yes

3.3 FCIP MIB Objects

You can refer to RFC 4404 for a description of the entire MIB.

3.3.1 Fully Supported Object Groups

The following groups from the FCIP MIB are fully supported.

Object group name	OID	Supported?
fcipEntityInstanceTable	1.3.6.1.2.1.224.1.1.4	Yes
fcipLinkTable	1.3.6.1.2.1.224.1.1.5	Yes
fcipTcpConnTable	1.3.6.1.2.1.224.1.1.6	Yes

3.3.2 Partially Supported Object Groups

The following groups from the FCIP MIB are partially supported.

3.3.2.1 FCIP Extended Link Table

The FCIP extended link table contains statistical information about FCIP tunnel transport operation. The information stored in this table is returned in response to `portshow fciptunnel` commands.

Object	OID	Supported?
fcipExtendedLinkTable	1.3.6.1.4.1.1588.4.1	Yes **NOTE:** The information stored in this table is returned in response to `portshow fciptunnel` commands.
fcipExtendedLinkEntry	1.3.6.1.4.1.1588.4.1.1	Yes
fcipExtendedLinkIfIndex	1.3.6.1.4.1.1588.4.1.1.1	Yes
fcipExtendedLinkTcpRetransmits	1.3.6.1.4.1.1588.4.1.1.2	Yes
fcipExtendedLinkTcpDropped Packets	1.3.6.1.4.1.1588.4.1.1.3	Yes
fcipExtendedLinkCompressionRatio	1.3.6.1.4.1.1588.4.1.1.4	Yes
fcipExtendedLinkTcpSmoothedRTT	1.3.6.1.4.1.1588.4.1.1.5	Yes
fcipExtendedLinkRawBytes	1.3.6.1.4.1.1588.4.1.1.6	Yes
fcipExtendedLinkCompressedBytes	1.3.6.1.4.1.1588.4.1.1.7	Yes
fcipExtendedLinkConnectedCount	1.3.6.1.4.1.1588.4.1.1.8	Yes
fcipExtendedLinkRtxRtxTO	1.3.6.1.4.1.1588.4.1.1.9	No
fcipExtendedLinkRtxDupAck	1.3.6.1.4.1.1588.4.1.1.10	No
fcipExtendedLinkDupAck	1.3.6.1.4.1.1588.4.1.1.11	Yes
fcipExtendedLinkRtt	1.3.6.1.4.1.1588.4.1.1.12	Yes
fcipExtendedLinkOoo	1.3.6.1.4.1.1588.4.1.1.13	Yes
fcipExtendedLinkSlowStarts	1.3.6.1.4.1.1588.4.1.1.14	Yes

3.3.2.2 FCIP Connection Statistics Table

This table contains statistical information about the FCIP circuit and connection compression, retransmission, packet loss, and latency. For the Brocade 7840 Switch, this table shows only circuit statistics.

This table gives FCIP circuit statistics for the FX8-24 DCX Extension Blade.

Corresponding CLI command:
```
portshow fcipcircuit -t/-q -perf
```

Object	OID	Supported?
fcipConnStatsTable	1.3.6.1.4.1.1588.4.2	Yes
fcipConnStatsEntry	1.3.6.1.4.1.1588.4.2.1	Yes
xfcipEntityId	1.3.6.1.4.1.1588.4.2.1.1	Yes
xfcipLinkIfIndex	1.3.6.1.4.1.1588.4.2.1.2	Yes
xfcipLinkIndex	1.3.6.1.4.1.1588.4.2.1.3	Yes
xfcipExtendedLinkTcpRetransmits	1.3.6.1.4.1.1588.4.2.1.4	Yes
xfcipExtendedLinkTcpDroppedPackets	1.3.6.1.4.1.1588.4.2.1.5	Yes
xfcipExtendedLinkCompressionRatio	1.3.6.1.4.1.1588.4.2.1.6	Yes
xfcipExtendedLinkTcpSmoothedRTT	1.3.6.1.4.1.1588.4.2.1.7	Yes
xfcipExtendedLinkRawBytes	1.3.6.1.4.1.1588.4.2.1.8	Yes
xfcipExtendedLinkCompressedBytes	1.3.6.1.4.1.1588.4.2.1.9	Yes
xfcipInBytesAvg	1.3.6.1.4.1.1588.4.2.1.10	Yes
xfcipOutBytesAvg	1.3.6.1.4.1.1588.4.2.1.11	Yes
xfcipOutMaxCommRt	1.3.6.1.4.1.1588.4.2.1.12	Yes
xfcipRTTMin	1.3.6.1.4.1.1588.4.2.1.13	Yes
xfcipRTTMax	1.3.6.1.4.1.1588.4.2.1.14	Yes
xfcipRTTAvg	1.3.6.1.4.1.1588.4.2.1.15	Yes
xfcipOOO	1.3.6.1.4.1.1588.4.2.1.16	Yes
xfcipDupAcks	1.3.6.1.4.1.1588.4.2.1.17	Yes
xfcipSlowStarts	1.3.6.1.4.1.1588.4.2.1.18	Yes
xfcipFCBytesIn	1.3.6.1.4.1.1588.4.2.1.19	Yes
xfcipFCBytesOut	1.3.6.1.4.1.1588.4.2.1.20	Yes
xfcipFCMaxCommRt	1.3.6.1.4.1.1588.4.2.1.21	Yes
xfcipIPBytesIn	1.3.6.1.4.1.1588.4.2.1.22	Yes
xfcipIPBytesOut	1.3.6.1.4.1.1588.4.2.1.23	Yes
xfcipIPMaxCommRt	1.3.6.1.4.1.1588.4.2.1.24	Yes

3.4 FIBRE-CHANNEL-FE-MIB (MIB-II Branch)

Brocade supports two versions of the FE MIB:

- FIBRE-CHANNEL-FE-MIB (RFC 2837) in the MIB-II branch.
- FCFABRIC-ELEMENT-MIB in the experimental branch.

The version of the FE MIB that is supported depends on the version of Fabric OS. The following table lists which FE MIB is supported in which Fabric OS version.

Fabric OS Version	FIBRE-CHANNEL-FE-MIB (MIB-II Branch)	FCFABRIC-ELEMENT-MIB (Experimental Branch)
8.2.0	Yes	No
8.1.0	Yes	No
8.0.1	Yes	No
8.0.0	Yes	No
7.4.0	Yes	No
7.3.0	Yes	No
7.2.0	Yes	No
7.1.0	Yes	No
7.0.0	Yes	No
6.4.1_fcoe	Yes	No
6.4.0	Yes	No
6.3.0	Yes	No
6.2.0	Yes	No
6.1.2_CEE	Yes	No
6.1.0	Yes	No
6.0.0	Yes	No
5.x	Yes	No
4.x	Yes	No
3.1.x	Yes	No
3.0.x	Yes	Yes
2.6.x	No	Yes

NOTE: The port swap feature does not have any effect on SNMP for the FE MIB.

NOTE: Brocade does not support the settable "Write" function for any of the Fibre Channel FE MIB objects except fcFxPortPhysAdminStatus.

3.4.1 Fully Supported Object Groups

The following groups from FIBRE-CHANNEL-FE-MIB are fully supported.

Object group name	OID	Supported?
fcFeConfig group	1.3.6.1.2.1.75.1.1	Yes This group consists of scalar objects and tables. It contains the configuration and service parameters of the fabric element and the Fx_Ports. The group represents a set of parameters associated with the fabric element or an Fx_Port to support its Nx_Ports.
fcFeStatus group	1.3.6.1.2.1.75.1.2	Yes This group consists of tables that contain operational status and established service parameters for the fabric element and the attached Nx_Ports. **NOTE:** The value for FcFxPortBbCreditAvailable should be less than or equal to that of fcFxPortBbCredit. The FcFxPortBbCreditAvailable value is not supported on SIM ports, long-distance ports, or fportbuffer ports.
fcFeError group	1.3.6.1.2.1.75.1.3	Yes This group consists of tables that contain information about the various types of errors detected. The management station might use the information in this group to determine the quality of the link between the Fx_Port and its attached Nx_Port. Implementation of this group is optional.
fcFeAccounting group	1.3.6.1.2.1.75.1.4	The Accounting group is supported only in Fabric OS 4.x. The Accounting group consists of the following Fabric OS tables: ■ Class 1 accounting table ■ Class 2 accounting table ■ Class 3 accounting table Each table contains accounting information for the Fx_Ports in the fabric element.
fcFeCapabilities group	1.3.6.1.2.1.75.1.5	Yes This group consists of a table that describes information about what each Fx_Port is inherently capable of operating or supporting. A capability might be used, as expressed in its respective object value in the Configuration group. Implementation of this group is optional.

3.5 SNMPv2 MIB

3.5.1 Fully Supported Object Groups

The following groups from th SNMPv2 MIB are fully supported.

Object group name	OID	Supported?
snmpTargetAddrTable	1.3.6.1.6.3.12.1.2	Yes
snmpTargetParamsTable	1.3.6.1.6.3.12.1.3	Yes
snmpCommunityTable	1.3.6.1.6.3.18.1.1	Yes

3.6 USM MIB Objects

3.6.1 Fully Supported Object Groups

The following groups from the USM MIB are fully supported.

Object group name	OID	Supported
usmStats	1.3.6.1.6.3.15.1.1	Yes
usmUser	1.3.6.1.6.3.15.1.2	Yes

Chapter 4: SW-MIB Objects

4.1 SW-MIB Overview

The descriptions of the MIB variables in this chapter come directly from the FC Switch MIB. The notes that follow the descriptions typically pertain to Brocade-specific information as provided by Broadcom.

NOTE: The port swap feature does not have any effect on SNMP for the SW MIB.

4.1.1 SW-MIB System Organization of MIB Objects

The following depict the organization and structure of the SW-MIB.

SW-MIB Overall Tree Structure

```
- iso
   - org
      - dod
         - internet
            - private
               - enterprises
                  - bcsi
                     - commDev
                        - fibreChannel
                           - fcSwitch
                              - sw
                                 - swTrapsV2
                                 - swSystem
                                 - swFabric
                                 - swModule
                                 - swAgtCfg
                                 - swFCport
                                 - swNs
                                 - swEvent
                                 - swFwSystem
                                 - swEndDevice
                                 - swGroup
                                 - swBlmPerfMnt
                                 - swTrunk
                                 - swTopTalker
                                 - swCpuorMemoryUsage
                                 - swConnUnitPortStatExtentionTable
                              - sw28k
                              - sw21kN24k
                              - sw20x0
                  - bcsiReg
                     - bcsiModules
                        - bcsiModculeTC
                        - swMibModule
```

swTrapsV2 Hierarchy

```
- swTrapsV2
    - swFault 1.3.6.1.4.1.1588.2.1.1.1.0.1
    - swSensorScn 1.3.6.1.4.1.1588.2.1.1.1.0.2
    - swFCPortScn 1.3.6.1.4.1.1588.2.1.1.1.0.3
    - swEventTrap 1.3.6.1.4.1.1588.2.1.1.1.0.4
    - swFabricWatchTrap 1.3.6.1.4.1.1588.2.1.1.1.0.5
    - swTrackChangesTrap 1.3.6.1.4.1.1588.2.1.1.1.0.6
    - swIPv6ChangeTrap 1.3.6.1.4.1.1588.2.1.1.1.0.7
    - swPmgrEventTrap 1.3.6.1.4.1.1588.2.1.1.1.0.8
    - swFabricReconfigTrap 1.3.6.1.4.1.1588.2.1.1.1.0.9
    - swFabricSegmentTrap 1.3.6.1.4.1.1588.2.1.1.1.0.10
    - swExtTrap 1.3.6.1.4.1.1588.2.1.1.1.0.11
    - swStateChangeTrap 1.3.6.1.4.1.1588.2.1.1.1.0.12
    - swPortMoveTrap 1.3.6.1.4.1.1588.2.1.1.1.0.13
    - swBrcdGenericTrap 1.3.6.1.4.1.1588.2.1.1.1.0.14
    - swDeviceStatusTrap 1.3.6.1.4.1.1588.2.1.1.1.0.15
```

swSystem Hierarchy

```
- swSystem
    - swCurrentDate 1.3.6.1.4.1.1588.2.1.1.1.1.1
    - swBootDate 1.3.6.1.4.1.1588.2.1.1.1.1.2
    - swFWLastUpdated 1.3.6.1.4.1.1588.2.1.1.1.1.3
    - swFlashLastUpdated 1.3.6.1.4.1.1588.2.1.1.1.1.4
    - swBootPromLastUpdated 1.3.6.1.4.1.1588.2.1.1.1.1.5
    - swFirmwareVersion 1.3.6.1.4.1.1588.2.1.1.1.1.6
    - swOperStatus 1.3.6.1.4.1.1588.2.1.1.1.1.7
    - swAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.8
    - swTelnetShellAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.9
    - swSsn 1.3.6.1.4.1.1588.2.1.1.1.1.10
    - swFlashDLOperStatus 1.3.6.1.4.1.1588.2.1.1.1.1.11
    - swFlashDLAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.12
    - swFlashDLHost 1.3.6.1.4.1.1588.2.1.1.1.1.13
    - swFlashDLUser 1.3.6.1.4.1.1588.2.1.1.1.1.14
    - swFlashDLFile 1.3.6.1.4.1.1588.2.1.1.1.1.15
    - swFlashDLPassword 1.3.6.1.4.1.1588.2.1.1.1.1.16
    - swBeaconOperStatus 1.3.6.1.4.1.1588.2.1.1.1.1.18
    - swBeaconAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.19
    - swDiagResult 1.3.6.1.4.1.1588.2.1.1.1.1.20
    - swNumSensors 1.3.6.1.4.1.1588.2.1.1.1.1.21
    - swSensorTable 1.3.6.1.4.1.1588.2.1.1.1.1.22
        - swSensorEntry 1.3.6.1.4.1.1588.2.1.1.1.1.22.1
            - swSensorIndex 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.1
            - swSensorType 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.2
            - swSensorStatus 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.3
            - swSensorValue 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.4
            - swSensorInfo 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.5
    - swTrackChangesInfo 1.3.6.1.4.1.1588.2.1.1.1.1.23
    - swID 1.3.6.1.4.1.1588.2.1.1.1.1.24
    - swEtherIPAddress 1.3.6.1.4.1.1588.2.1.1.1.1.25
    - swEtherIPMask 1.3.6.1.4.1.1588.2.1.1.1.1.26
    - swFCIPAddress 1.3.6.1.4.1.1588.2.1.1.1.1.27
    - swFCIPMask 1.3.6.1.4.1.1588.2.1.1.1.1.28
    - swIPv6Address 1.3.6.1.4.1.1588.2.1.1.1.1.29
    - swIPv6Status 1.3.6.1.4.1.1588.2.1.1.1.1.30
    - swModel 1.3.6.1.4.1.1588.2.1.1.1.1.31
    - swTestString 1.3.6.1.4.1.1588.2.1.1.1.1.32
    - swPortList 1.3.6.1.4.1.1588.2.1.1.1.1.33
    - swBrcdTrapBitMask 1.3.6.1.4.1.1588.2.1.1.1.1.34
    - swFCPortPrevType 1.3.6.1.4.1.1588.2.1.1.1.1.35
    - swDeviceStatus 1.3.6.1.4.1.1588.2.1.1.1.1.36
```

swFabric Hierarchy

```
- swFabric
   - swDomainID 1.3.6.1.4.1.1588.2.1.1.1.2.1
   - swPrincipalSwitch 1.3.6.1.4.1.1588.2.1.1.1.2.2
   - swNumNbs 1.3.6.1.4.1.1588.2.1.1.1.2.8
   - swNbTable 1.3.6.1.4.1.1588.2.1.1.1.2.9
      - swNbEntry 1.3.6.1.4.1.1588.2.1.1.1.2.9.1
         - swNbIndex 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.1
         - swNbMyPort 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.2
         - swNbRemDomain 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.3
         - swNbRemPort 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.4
         - swNbBaudRate 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.5
         - swNbIslState 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.6
         - swNbIslCost 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.7
         - swNbRemPortName 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.8
   - swFabricMemTable 1.3.6.1.4.1.1588.2.1.1.1.2.10
   - swIDIDMode 1.3.6.1.4.1.1588.2.1.1.1.2.11
   - swPmgrEventType 1.3.6.1.4.1.1588.2.1.1.1.2.12
   - swPmgrEventTime 1.3.6.1.4.1.1588.2.1.1.1.2.13
   - swPmgrEventDescr 1.3.6.1.4.1.1588.2.1.1.1.2.14
   - swVfId 1.3.6.1.4.1.1588.2.1.1.1.2.15
   - swVfName 1.3.6.1.4.1.1588.2.1.1.1.2.16
```

swModule Hierarchy

```
- swModule (1.3.6.1.4.1.1588.2.1.1.1.3)
```

swAgtCfg Hierarchy

```
- swAgtCfg
   - swAgtCmtyTable 1.3.6.1.4.1.1588.2.1.1.1.4.11
      - swAgtCmtyEntry 1.3.6.1.4.1.1588.2.1.1.1.4.11.1
         - swAgtCmtyIdx 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.1
         - swAgtCmtyStr 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.2
         - swAgtTrapRcp 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.3
         - swAgtTrapSeverityLevel 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.4
```

swFCport Hierarchy

```
- swFCport (1.3.6.1.4.1.1588.2.1.1.1.6)
   - swFCPortCapacity 1.3.6.1.4.1.1588.2.1.1.1.6.1
   - swFCPortTable 1.3.6.1.4.1.1588.2.1.1.1.6.2
      - swFCPortEntry 1.3.6.1.4.1.1588.2.1.1.1.6.2.1
         - swFCPortIndex 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.1
         - swFCPortType 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.2
         - swFCPortPhyState 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.3
         - swFCPortOpStatus 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.4
         - swFCPortAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.5
         - swFCPortLinkState 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.6
         - swFCPortTxType 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.7
         - swFCPortTxWords 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.11
         - swFCPortRxWords 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.12
         - swFCPortTxFrames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.13
         - swFCPortRxFrames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.14
         - swFCPortRxC2Frames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.15
         - swFCPortRxC3Frames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.16
         - swFCPortRxLCs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.17
         - swFCPortRxMcasts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.18
         - swFCPortTooManyRdys 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.19
         - swFCPortNoTxCredits 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.20
         - swFCPortRxEncInFrs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.21
         - swFCPortRxCrcs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.22
         - swFCPortRxTruncs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.23
         - swFCPortRxTooLongs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.24
         - swFCPortRxBadEofs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.25
         - swFCPortRxEncOutFrs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.26
         - swFCPortRxBadOs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.27
         - swFCPortC3Discards 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.28
         - swFCPortMcastTimedOuts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.29
         - swFCPortTxMcasts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.30
         - swFCPortLipIns 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.31
         - swFCPortLipOuts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.32
         - swFCPortLipLastAlpa 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.33
         - swFCPortWwn 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.34
         - swFCPortSpeed 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.35
         - swFCPortName 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.36
         - swFCPortSpecifier 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.37
         - swFCPortFlag 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.38
         - swFCPortBrcdType 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.39
```

swNs Hierarchy

```
- swNs
   - swNsLocalNumEntry 1.3.6.1.4.1.1588.2.1.1.1.7.1
   - swNsLocalTable 1.3.6.1.4.1.1588.2.1.1.1.7.2
      - swNsLocalEntry 1.3.6.1.4.1.1588.2.1.1.1.7.2.1
         - swNsEntryIndex 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.1
         - swNsPortID 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.2
         - swNsPortType 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.3
         - swNsPortName 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.4
         - swNsPortSymb 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.5
         - swNsNodeName 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.6
         - swNsNodeSymb 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.7
         - swNsIPA 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.8
         - swNsIpAddress 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.9
         - swNsCos 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.10
         - swNsFc4 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.11
         - swNsIpNxPort 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.12
         - swNsWwn 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.13
         - swNsHardAddr 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.14
```

swEvent Hierarchy

```
- swEvent
   - swEventTrapLevel 1.3.6.1.4.1.1588.2.1.1.1.8.1
   - swEventNumEntries 1.3.6.1.4.1.1588.2.1.1.1.8.4
   - swEventTable 1.3.6.1.4.1.1588.2.1.1.1.8.5
      - swEventEntry 1.3.6.1.4.1.1588.2.1.1.1.8.5.1
         - swEventIndex 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.1
         - swEventTimeInfo 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.2
         - swEventLevel 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.3
         - swEventRepeatCount 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.4
         - swEventDescr 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.5
         - swEventVfid 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.6
```

swFwSystem Hierarchy

```
- swFwSystem
    - swFwFabricWatchLicense 1.3.6.1.4.1.1588.2.1.1.1.10.1
    - swFwClassAreaTable 1.3.6.1.4.1.1588.2.1.1.1.10.2
        - swFwClassAreaEntry 1.3.6.1.4.1.1588.2.1.1.1.10.2.1
            - swFwClassAreaIndex 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.1
            - swFwWriteThVals 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.2
            - swFwDefaultUnit 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.3
            - swFwDefaultTimebase 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.4
            - swFwDefaultLow 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.5
            - swFwDefaultHigh 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.6
            - swFwDefaultBufSize 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.7
            - swFwCustUnit 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.8
            - swFwCustTimebase 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.9
            - swFwCustLow 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.10
            - swFwCustHigh 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.11
            - swFwCustBufSize 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.12
            - swFwThLevel 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.13
            - swFwWriteActVals 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.14
            - swFwDefaultChangedActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.15
            - swFwDefaultExceededActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.16
            - swFwDefaultBelowActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.17
            - swFwDefaultAboveActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.18
            - swFwDefaultInBetweenActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.19
            - swFwCustChangedActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.20
            - swFwCustExceededActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.21
            - swFwCustBelowActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.22
            - swFwCustAboveActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.23
            - swFwCustInBetweenActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.24
            - swFwValidActs 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.25
            - swFwActLevel 1.3.6.1.4.1.1588.2.1.1.1.10.2.1.26
    - swFwThresholdTable 1.3.6.1.4.1.1588.2.1.1.1.10.3
        - swFwThresholdEntry 1.3.6.1.4.1.1588.2.1.1.1.10.3.1
            - swFwThresholdIndex 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.1
            - swFwStatus 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.2
            - swFwName 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.3
            - swFwLabel 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.4
            - swFwCurVal 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.5
            - swFwLastEvent 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.6
            - swFwLastEventVal 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.7
            - swFwLastEventTime 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.8
            - swFwLastState 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.9
            - swFwBehaviorType 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.10
            - swFwBehaviorInt 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.11
            - swFwLastSeverityLevel 1.3.6.1.4.1.1588.2.1.1.1.10.3.1.12
```

swEndDevice Hierarchy

```
- swEndDevice
    - swEndDeviceRlsTable 1.3.6.1.4.1.1588.2.1.1.1.21.1
        - swEndDeviceRlsEntry 1.3.6.1.4.1.1588.2.1.1.1.21.1.1
            - swEndDevicePort 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.1
            - swEndDeviceAlpa 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.2
            - swEndDevicePortID 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.3
            - swEndDeviceLinkFailure 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.4
            - swEndDeviceSyncLoss 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.5
            - swEndDeviceSigLoss 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.6
            - swEndDeviceProtoErr 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.7
            - swEndDeviceInvalidWord 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.8
            - swEndDeviceInvalidCRC 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.9
```

swGroup Hierarchy

```
- swGroup
    - swGroupTable 1.3.6.1.4.1.1588.2.1.1.1.22.1
        - swGroupEntry 1.3.6.1.4.1.1588.2.1.1.1.22.1.1
            - swGroupIndex 1.3.6.1.4.1.1588.2.1.1.1.22.1.1.1
            - swGroupName 1.3.6.1.4.1.1588.2.1.1.1.22.1.1.2
            - swGroupType 1.3.6.1.4.1.1588.2.1.1.1.22.1.1.3
    - swGroupMemTable 1.3.6.1.4.1.1588.2.1.1.1.22.2
        - swGroupMemEntry 1.3.6.1.4.1.1588.2.1.1.1.22.2.1
            - swGroupID 1.3.6.1.4.1.1588.2.1.1.1.22.2.1.1
            - swGroupMemWwn 1.3.6.1.4.1.1588.2.1.1.1.22.2.1.2
            - swGroupMemPos 1.3.6.1.4.1.1588.2.1.1.1.22.2.1.
```

swBlmPerfMnt Hierarchy

```
- swBlmPerfMnt
    - swBlmPerfALPAMntTable 1.3.6.1.4.1.1588.2.1.1.1.23.1
        - swBlmPerfALPAMntEntry 1.3.6.1.4.1.1588.2.1.1.1.23.1.1
            - swBlmPerfAlpaPort 1.3.6.1.4.1.1588.2.1.1.1.23.1.1.1
            - swBlmPerfAlpaIndx 1.3.6.1.4.1.1588.2.1.1.1.23.1.1.2
            - swBlmPerfAlpa 1.3.6.1.4.1.1588.2.1.1.1.23.1.1.3
            - swBlmPerfAlpaCRCCnt 1.3.6.1.4.1.1588.2.1.1.1.23.1.1.4
    - swBlmPerfEEMntTable 1.3.6.1.4.1.1588.2.1.1.1.23.2
        - swBlmPerfEEMntEntry 1.3.6.1.4.1.1588.2.1.1.1.23.2.1
            - swBlmPerfEEPort 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.1
            - swBlmPerfEERefKey 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.2
            - swBlmPerfEECRC 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.3
            - swBlmPerfEEFCWRx 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.4
            - swBlmPerfEEFCWTx 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.5
            - swBlmPerfEESid 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.6
            - swBlmPerfEEDid 1.3.6.1.4.1.1588.2.1.1.1.23.2.1.7
    - swBlmPerfFltMntTable 1.3.6.1.4.1.1588.2.1.1.1.23.3
        - swBlmPerfFltMntEntry 1.3.6.1.4.1.1588.2.1.1.1.23.3.1
            - swBlmPerfFltPort 1.3.6.1.4.1.1588.2.1.1.1.23.3.1.1
            - swBlmPerfFltRefkey 1.3.6.1.4.1.1588.2.1.1.1.23.3.1.2
            - swBlmPerfFltCnt 1.3.6.1.4.1.1588.2.1.1.1.23.3.1.3
            - swBlmPerfFltAlias 1.3.6.1.4.1.1588.2.1.1.1.23.3.1.4
```

swTrunk Hierarchy

```
- swTrunk
    - swSwitchTrunkable 1.3.6.1.4.1.1588.2.1.1.1.24.1
    - swTrunkTable 1.3.6.1.4.1.1588.2.1.1.1.24.2
        - swTrunkEntry 1.3.6.1.4.1.1588.2.1.1.1.24.2.1
            - swTrunkPortIndex 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.1
            - swTrunkGroupNumber 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.2
            - swTrunkMaster 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.3
            - swPortTrunked 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.4
    - swTrunkGrpTable 1.3.6.1.4.1.1588.2.1.1.1.24.3
        - swTrunkGrpEntry 1.3.6.1.4.1.1588.2.1.1.1.24.3.1
            - swTrunkGrpNumber 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.1
            - swTrunkGrpMaster 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.2
            - swTrunkGrpTx 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.3
            - swTrunkGrpRx 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.4
```

swTopTalker Hierarchy

```
- swTopTalker
    - swTopTalkerMntMode 1.3.6.1.4.1.1588.2.1.1.1.25.1
    - swTopTalkerMntNumEntries 1.3.6.1.4.1.1588.2.1.1.1.25.2
    - swTopTalkerMntTable 1.3.6.1.4.1.1588.2.1.1.1.25.3
        - swTopTalkerMntEntry 1.3.6.1.4.1.1588.2.1.1.1.25.3.1
            - swTopTalkerMntIndex 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.1
            - swTopTalkerMntPort 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.2
            - swTopTalkerMntSpid 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.3
            - swTopTalkerMntDpid 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.4
            - swTopTalkerMntflow 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.5
            - swTopTalkerMntSwwn 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.6
            - swTopTalkerMntDwwn 1.3.6.1.4.1.1588.2.1.1.1.25.3.1.7
```

swCpuorMemoryUsage Hierarchy

```
- swCpuorMemoryUsage
    - swCpuUsage 1.3.6.1.4.1.1588.2.1.1.1.26.1
    - swCpuNoOfRetries 1.3.6.1.4.1.1588.2.1.1.1.26.2
    - swCpuUsageLimit 1.3.6.1.4.1.1588.2.1.1.1.26.3
    - swCpuPollingInterval 1.3.6.1.4.1.1588.2.1.1.1.26.4
    - swCpuAction 1.3.6.1.4.1.1588.2.1.1.1.26.5
    - swMemUsage 1.3.6.1.4.1.1588.2.1.1.1.26.6
    - swMemNoOfRetries 1.3.6.1.4.1.1588.2.1.1.1.26.7
    - swMemUsageLimit 1.3.6.1.4.1.1588.2.1.1.1.26.8
    - swMemPollingInterval 1.3.6.1.4.1.1588.2.1.1.1.26.9
    - swMemAction 1.3.6.1.4.1.1588.2.1.1.1.26.10
    - swMemUsageLimit1 1.3.6.1.4.1.1588.2.1.1.1.26.11
    - swMemUsageLimit3 1.3.6.1.4.1.1588.2.1.1.1.26.12
```

swConnUnitPortStatExtentionTable Hierarchy

```
- swConnUnitPortStatExtentionTable
    - swConnUnitPortStatEntry 1.3.6.1.4.1.1588.2.1.1.1.27.1
    - swConnUnitCRCWithBadEOF 1.3.6.1.4.1.1588.2.1.1.1.27.1.1
    - swConnUnitZeroTenancy 1.3.6.1.4.1.1588.2.1.1.1.27.1.2
    - swConnUnitFLNumOfTenancy 1.3.6.1.4.1.1588.2.1.1.1.27.1.3
    - swConnUnitNLNumOfTenancy 1.3.6.1.4.1.1588.2.1.1.1.27.1.4
    - swConnUnitStopTenancyStarVation 1.3.6.1.4.1.1588.2.1.1.1.27.1.5
    - swConnUnitOpend 1.3.6.1.4.1.1588.2.1.1.1.27.1.6
    - swConnUnitTransferConnection 1.3.6.1.4.1.1588.2.1.1.1.27.1.7
    - swConnUnitOpen 1.3.6.1.4.1.1588.2.1.1.1.27.1.8
    - swConnUnitInvalidARB 1.3.6.1.4.1.1588.2.1.1.1.27.1.9
    - swConnUnitFTB1Miss 1.3.6.1.4.1.1588.2.1.1.1.27.1.10
    - swConnUnitFTB2Miss 1.3.6.1.4.1.1588.2.1.1.1.27.1.11
    - swConnUnitFTB6Miss 1.3.6.1.4.1.1588.2.1.1.1.27.1.12
    - swConnUnitZoneMiss 1.3.6.1.4.1.1588.2.1.1.1.27.1.13
    - swConnUnitLunZoneMiss 1.3.6.1.4.1.1588.2.1.1.1.27.1.14
    - swConnUnitBadEOF 1.3.6.1.4.1.1588.2.1.1.1.27.1.15
    - swConnUnitLCRX 1.3.6.1.4.1.1588.2.1.1.1.27.1.16
    - swConnUnitRDYPriority 1.3.6.1.4.1.1588.2.1.1.1.27.1.17
    - swConnUnitLli 1.3.6.1.4.1.1588.2.1.1.1.27.1.18
    - swConnUnitInterrupts 1.3.6.1.4.1.1588.2.1.1.1.27.1.19
    - swConnUnitUnknownInterrupts 1.3.6.1.4.1.1588.2.1.1.1.27.1.20
    - swConnUnitTimedOut 1.3.6.1.4.1.1588.2.1.1.1.27.1.21
    - swConnUnitProcRequired 1.3.6.1.4.1.1588.2.1.1.1.27.1.22
    - swConnUnitTxBufferUnavailable 1.3.6.1.4.1.1588.2.1.1.1.27.1.23
    - swConnUnitStateChange 1.3.6.1.4.1.1588.2.1.1.1.27.1.24
    - swConnUnitC3DiscardDueToRXTimeout 1.3.6.1.4.1.1588.2.1.1.1.27.1.25
    - swConnUnitC3DiscardDueToDestUnreachable 1.3.6.1.4.1.1588.2.1.1.1.27.1.26
    - swConnUnitC3DiscardDueToTXTimeout 1.3.6.1.4.1.1588.2.1.1.1.27.1.27
    - swConnUnitC3DiscardOther 1.3.6.1.4.1.1588.2.1.1.1.27.1.28
    - swConnUnitPCSErrorCounter 1.3.6.1.4.1.1588.2.1.1.1.27.1.29
```

4.1.2 Textual Conventions for the SW-MIB

The following table lists the textual conventions used for the SW-MIB.

Table 3: SW-MIB Textual Conventions

Type Definition	Value	Description
FcWwn	Octet string of size 8	The World Wide Name (WWN) of Brocade-specific products and ports.
SwDomainIndex	Integer of size 1 to 239	Fibre Channel domain ID of the switch.
SwNbIndex	Integer of size 1 to 2048	Index of the neighbor inter-switch link (ISL) entry.
SwSensorIndex	Integer of size 1 to 1024	Index of the sensor entry.
SwPortIndex	Integer32	Index of the port, starting from 1 up to the maximum number of ports on the Brocade switch.
SwTrunkMaster	Integer32	Index of the trunk master, starting from 1 up to the maximum number of trunk groups on the Brocade switch.

Table 3: SW-MIB Textual Conventions (Continued)

Type Definition	Value	Description
SwFwActs	Integer	Valid Fabric Watch actions: 0 swFwNoAction 1 swFwErrlog 2 swFwSnmptrap 3 swFwErrlogSnmptrap 4 swFwPortloglock 5 swFwErrlogPortloglock 6 swFwSnmptrapPortloglock 7 swFwErrlogSnmptrapPortloglock 8 swFwRn 9 swFwElRn 10 swFwStRn 11 swFwElStRn 12 swFwPlRn 13 swFwElPlRn 14 swFwStPlRn 15 swFwElStPlRn 16 swFwMailAlert 17 swFwMailAlertErrlog 18 swFwMailAlertSnmptrap 19 swFwMailAlertErrlogSnmptrap 20 swFwMailAlertPortloglock 21 swFwMailAlertErrlogPortloglock 22 swFwMailAlertSnmptrapPortloglock 23 swFwMailAlertErrlogSnmptrapPortloglock 24 swFwMailAlertRn 25 swFwElMailAlertRn 26 swFwMailAlertStRn 27 swFwMailAlertElStRn 28 swFwMailAlertPlRn 29 swFwMailAlertElPlRn 30 swFwMailAlertStPlRn 55 swFwMailAlertElStPlPf 63 swFwMailAlertElStPlRnPf
SwFwLevels	Integer	Threshold or Action levels: 1 swFwReserved (Not supported) 2 swFwDefault 3 swFwCustom Commands: ■ `portthconfig` To set port thresholds ■ `thconfig` To set other thresholds ■ `sysmonitor --config` To set ENV/RES class ENV- Environment, RES - Resource

Table 3: SW-MIB Textual Conventions (Continued)

Type Definition	Value	Description	
SwFwClassesAreas	Integer	Index of Fabric Watch classes and areas where thresholds can be monitored:	EE Performance Monitor class: 54 swFwPerfEToERxCnt 55 swFwPerfEToETxCnt
		Environment class: 1 swFwEnvTemp 2 swFwEnvFan (Not supported) 3 swFwEnvPS (Not supported)	Filter Performance Monitor class: 56 swFwPerffltCusDef
		SFP class: 4 swFwTransceiverTemp 5 swFwTransceiverRxp 6 swFwTransceiverTxp 7 swFwTransceiverCurrent 57 swFwTransceiverVoltage	Security class: 58 swFwSecTelnetViolations 59 swFwSecHTTPViolations 60 swFwSecAPIViolations (Not supported) 61 swFwSecRSNMPViolations (Not supported) 62 swFwSecWSNMPViolations (Not supported) 63 swFwSecSESViolations (Not supported) 64 swFwSecMSViolations (Not supported) 65 swFwSecSerialViolations (Not supported) 66 swFwSecFPViolations (Not supported) 67 swFwSecSCCViolations 68 swFwSecDCCViolations 69 swFwSecLoginViolations 70 swFwSecInvaledTS (Not supported) 71 swFwSecInvalidSign (Not supported) 72 swFwSecInvalidCert 73 swFwSecSlapFail 74 swFwSecSlapBadPkt (Not supported) 75 swFwSecTSOutSync 76 swFwSecNoFcs 77 swFwSecIncompDB 78 swFwSecIllegalCmd
		Port class: 8 swFwPortLink 9 swFwPortSync 10 swFwPortSignal 11 swFwPortPe 12 swFwPortWords 13 swFwPortCrcs 14 swFwPortRXPerf 15 swFwPortTXPerf 16 swFwPortState 86 swFwPortLr 90 swFwPortC3Discard	
		Fabric class: 17 swFwFabricEd 18 swFwFabricFr 19 swFwFabricDi 20 swFwFabricSc 21 swFwFabricZc 23 swFwFabricFl 24 swFwFabricGs	E_Port class: 25 swFwEPortLink 26 swFwEPortSync 27 swFwEPortSignal 28 swFwEPortPe 29 swFwEPortWords 30 swFwEPortCrcs 31 swFwEPortRXPerf 32 swFwEPortTXPerf 33 swFwEPortState 84 swFwEPortUtil (Not supported) 87 swFwEPortLr 91 swFwEPortC3Discard 97 swFwEPortTrunkUtil 94 swFwVEPortStateChange 95 swFwVEPortUtil 96 swFwVEPortPktLoss
		F/FL Port (Optical) class: 43 swFwFOPPortLink 44 swFwFOPPortSync 45 swFwFOPPortSignal 46 swFwFOPPortPe 47 swFwFOPPortWords 48 swFwFOPPortCrcs 49 swFwFOPPortRXPerf 50 swFwFOPPortTXPerf 51 swFwFOPPortState 52 swFwFOPPortWords 89 swFwFOPPortLr 93 swFwFOPPortC3Discard 99 swFwFOPPortTrunkUtil	
			Resource class: 83 swFwResourceFlash

Table 3: SW-MIB Textual Conventions (Continued)

Type Definition	Value	Description
		EportUtil and EportPktl are the MIB that is used for VE ports for Legacy FCIP (FR4-18i router blade/Brocade 7500), whereas VEPortUtil and VEPortPktlLoss are used for VE ports for the Brocade 7800 Extension Switch and FX8-24 DCX Extension Blade.
		In the index swFwEnvTemp, Env refers to the Environment class and Temp refers to the area temperature.
SwFwWriteVals	Integer	Write-only variable for applying or canceling values or action matrix changes:
		1 swFwCancelWrite
		2 swFwApplyWrite
SwFwTimebase	Integer	Timebase for thresholds:
		1 swFwTbNone
		2 swFwTbSec
		3 swFwTbMin
		4 swFwTbHour
		5 swFwTbDay
SwFwStatus	Integer	Status for thresholds:
		1 disabled
		2 enabled
SwFwEvent	Integer	Possible events available:
		1 started
		2 changed
		3 exceeded
		4 below
		5 above
		6 inBetween
		7 lowBufferCrsd
SwFwBehavior	Integer	Behavior type for thresholds:
		1 triggered
		2 continuous
SwFwState	Integer	State type for last events:
		1 swFwInformative
		2 swFwNormal
		3 swFwfaulty
SwFwLicense	Integer	Fabric Watch License state:
		1 swFwLicensed
		2 swFwNotLicensed

4.2 SW Traps

This section contains descriptions and other information that are specific to sw traps.

In Fabric OS 6.2.0 and later, sw traps have an extra associated binding to indicate the virtual fabric (VF). The traps have a virtual fabric ID (VFID) associated with them.

For the fourteen traps defined in the SW-MIB and how to configure the trap, see Table 4.

Table 4: SW-MIB Traps

Trap Name	Commands to Configure
"swFault" on page 48 (not supported)	N/A
"swSensorScn" on page 48	N/A
"swFCPortScn" on page 49	Always on.
"swEventTrap" on page 49	For more information, refer to the `snmpConfig` command in the *Brocade Fabric OS Command Reference Manual*.
"swTrackChangesTrap" on page 50	Fabric OS command: `trackChangesSet` and `trackChangesShow.`
"swIPv6ChangeTrap" on page 50	For more information, refer to the `snmpConfig` command in the *Brocade Fabric OS Command Reference Manual*.
"swPmgrEventTrap" on page 50	
"swFabricReconfigTrap" on page 51	
"swFabricSegmentTrap" on page 51	
"swExtTrap" on page 51	
"swStateChangeTrap" on page 51	
"swPortMoveTrap" on page 51	
"swBrcdGenericTrap" on page 52	
"swDeviceStatusTrap" on page 52	

The swSsn variable is optional in trap messages.

Select either the previous behavior in which the Enterprise field is taken from sysObjectID or the new behavior in which the value in the Enterprise field will always be "sw":

- Set the value of this variable to 0 to use the sysObjectID.
- Set the value to 1 to use the fixed enterprise value, "sw" (1.3.6.1.4.1.1588.2.1.1.1.).

Trap name and OID	Variables	Description
swFault 1.3.6.1.4.1.1588.2.1.1.1.0.1	swDiagResult swSsn	This trap is no longer generated. A swFault is generated whenever the diagnostics detect a fault with the switch. #TYPE: Switch is faulty. #SUMMARY Faulty reason: %d and SSN is #%s #ARGUMENTS 0, 1 #SEVERITY Critical #TIMEINDEX1 #STATE: Nonoperational
swSensorScn 1.3.6.1.4.1.1588.2.1.1.1.0.2	swSensorStatus swSensorIndex swSensorType swSensorValue swSensorInfo swSsn	A swSensorScn (2) is generated whenever an environment sensor changes its operational state: for instance, if a fan stops working. The VarBind in the Trap Data Unit contains the corresponding instance of the sensor status, sensor index, sensor type, sensor value (reading), and sensor information. Note that the sensor information contains the type of sensor and its number, in textual format. #TYPE: A sensor (temperature, fan, or other) changed its operational state. #SUMMARY %s: is currently in state %d and SSN is #%s #ARGUMENTS: 4, 0, 5 #SEVERITY: Informational #TIMEINDEX: 1 #STATE: Operational

Trap name and OID	Variables	Description
swFCPortScn 1.3.6.1.4.1.1588.2.1.1.1.0.3	swFCPortOpStatus swFCPortIndex swFCPortName swFCPortWwn swFCPortPrevType swFCPortBrcdType swSsn swFCPortFlag swVfId swFCPortDisableReason	A swFCPortScn (3) is generated whenever an FC port changes its operational state or port type. The events that trigger this trap are as follows: ■ Port changes its state to online or offline. ■ Port type changes to E_Port, F_Port, or FL_Port. The VarBind in the Trap Data Unit contains the corresponding instance of the FC port's operational status, index, swFCPortName, and swSsn. swFCPortName and swSsn are optional. ■ For offline events swFCPortDisableReason will have the proper disable reason code. For online events, the disable reason code is 0. #TYPE: A Fiber Channel Port changed its operational state. #SUMMARY Port Index %d changed state to %d. Port Name: %s and SSN is #%s #ARGUMENTS 1, 0, 2, 3 #SEVERITY Informational #TIMEINDEX1 #STATE: Operational
swEventTrap 1.3.6.1.4.1.1588.2.1.1.1.0.4	swEventIndex swEventTimeInfo swEventLevel swEventRepeatCount swEventDescr swSsn swVfId	This trap is generated when an event occurs with a level that is at or below swEventTrapLevel. #TYPE: A firmware event has been logged. #SUMMARY Event %d: %s (severity level %d) - %s SSN is #%s #ARGUMENTS 0, 1, 2, 4, 5 #SEVERITY Informational #TIMEINDEX1 #STATE: Operational Each trap recipient has a configured severity level association. Whenever an error message is generated at or above that configured severity level the recipient is notified of the event. This trap is generated for all RASLog messages. More details on any particular event, refer to the *Brocade Fabric OS Message Reference Manual*.

Trap name and OID	Variables	Description
swTrackChangesTrap 1.3.6.1.4.1.1588.2.1.1.1.0.6	swTrackChangesInfo swSsn swVfId	The trap to be sent for tracking login, logout, or configuration changes. #TYPE: Track changes has generated a trap. #SUMMARY %s and SSN is #%s #ARGUMENTS 0, 1 #SEVERITY Informational #TIMEINDEX1 #STATE: Operational Some of the triggers that will generate this trap are: ■　Logout ■　Unsuccessful login ■　Successful login ■　Switch configuration changes ■　Track changes on and off This trap is sent when track changes is set to ENABLED and is configured to send SNMP traps on track events. Use the `trackchangesset` command to enable the track changes feature and SNMP trap mode. **NOTE:** This trap is obsoleted.
swIPv6ChangeTrap 1.3.6.1.4.1.1588.2.1.1.1.0.7	swIPv6Address swIPv6Status	This trap is generated when an IPv6 address status change event occurs. It is generated only when the IPv6 stateless state changes to the deprecation state and not for address change notification.
swPmgrEventTrap 1.3.6.1.4.1.1588.2.1.1.1.0.8	swPmgrEventType swPmgrEventTime swPmgrEventDescr swSsn swVfId	This trap is generated when any partition manager change happens. This trap is generated when: ■　Logical switch is created or deleted. ■　Port is moved between logical switches. ■　Switch FID changes. ■　When any logical switch is changed to a base switch. ■　VF is enabled or disabled.

Trap name and OID	Variables	Description
swFabricReconfigTrap 1.3.6.1.4.1.1588.2.1.1.1.0.9	swDomainID	The trap to be sent for tracking fabric reconfiguration. This trap is generated under the following circumstances: - Two switches with the same domain ID have connected to one another. - Two fabrics have joined. - An E_Port has gone offline. - A principal link has segmented from the fabric. - Zone has conflicts. - Domain has conflicts. - Segmentation of the principal link between two switches. - Incompatible link parameters. During E_Port initialization, ports exchange link parameters. Rarely, incompatible parameters result in segmentation.
swFabricSegmentTrap 1.3.6.1.4.1.1588.2.1.1.1.0.10	swFCPortIndex swFCPortName swSsn swFCPortFlag swVfId	The trap to be sent for tracking segmentation changes.
swExtTrap 1.3.6.1.4.1.1588.2.1.1.1.0.11	—	This trap adds the SSN binding to the traps if it is enabled. This is an internal trap.
swStateChangeTrap 1.3.6.1.4.1.1588.2.1.1.1.0.12	swOperStatus swVfId	This trap is sent when the switch changes it state to online or offline. This trap is disabled by default.
swPortMoveTrap 1.3.6.1.4.1.1588.2.1.1.1.0.13	swPortList swVfId	This trap is sent when the ports are moved from one switch to another. This trap is disabled by default.

Trap name and OID	Variables	Description
swBrcdGenericTrap 1.3.6.1.4.1.1588.2.1.1.1.0.14	swBrcdTrapBitMask swBrcdBitObjVal swVfId	This trap is sent for one of the following events: ■ Fabric change ■ Device change ■ FAPWWN change ■ FDMI events ■ Routing policy change ■ Diagnostics port configuration change ■ Polling status ■ Dynamic port name change ■ Dynamic port name feature enable/disable event This trap is enabled by default. **NOTE:** This trap is for internal use.
swDeviceStatusTrap 1.3.6.1.4.1.1588.2.1.1.1.0.15	swFCPortSpecifier swDeviceStatus swEndDevicePortID swNsNodeName swNsPortName	This trap is sent whenever a device logs in or logs out.

4.3 Switch System Group

Object and OID	Access	Description
swSystem 1.3.6.1.4.1.1588.2.1.1.1.1	Not accessible	The OID subtree for the switch system group.

swCurrentDate
1.3.6.1.4.1.1588.2.1.1.1.1.1
	Read only	The current date and time.
		The return string displays using the following format:
		`ddd MMM DD hh:mm:ss yyyy`
		Where:
		ddd = day
		MMM = month
		DD = date
		hh = hour
		mm = minute
		ss = seconds
		yyyy = year
		For example:
		`Thu Aug 17 15:16:09 2000`

Object and OID	Access	Description

swBootDate
1.3.6.1.4.1.1588.2.1.1.1.1.2
	Read only	The date and time when the system last booted.
		The return string displays using the following format:
		`ddd MMM DD hh:mm:ss yyyy`
		Where:
		ddd = day
		MMM = month
		DD = date
		hh = hour
		mm = minute
		ss = seconds
		yyyy = year
		For example:
		`Thu Aug 17 15:16:09 2000`

swFWLastUpdated
1.3.6.1.4.1.1588.2.1.1.1.1.3
	Read only	The date and time when the firmware was last loaded to the switch.
		The return string displays using the following format:
		`ddd MMM DD hh:mm:ss yyyy`
		Where:
		ddd = day
		MMM = month
		DD = date
		hh = hour
		mm = minute
		ss = seconds
		yyyy = year
		For example:
		`Thu Aug 17 15:16:09 2000`
		NOTE: This object is obsoleted.

swFlashLastUpdated
1.3.6.1.4.1.1588.2.1.1.1.1.4
	Read only	The date and time when the firmware was last downloaded or the configuration file was last changed.
		The return string displays using the following format:
		`ddd MMM DD hh:mm:ss yyyy`
		Where:
		ddd = day
		MMM = month
		DD = date
		hh = hour
		mm = minute
		ss = seconds
		yyyy = year
		For example:
		`Thu Aug 17 15:16:09 2000`

Object and OID	Access	Description

swBootPromLastUpdated
1.3.6.1.4.1.1588.2.1.1.1.1.5
	Read only	The date and time when the Boot PROM was last updated.
		The return string displays using the following format:
		`ddd MMM DD hh:mm:ss yyyy`
		Where:
		ddd = day
		MMM = month
		DD = date
		hh = hour
		mm = minute
		ss = seconds
		yyyy = year
		For example:
		`Thu Aug 17 15:16:09 2000`

swFirmwareVersion 1.3.6.1.4.1.1588.2.1.1.1.1.6	Read only	The current version of the firmware. The return value is displayed using the following format: `vM.m.f` Where: v = deployment indicator M = major version m = minor version f = software maintenance version For example, 6.1.0_main_bld36 describes firmware version 6.1.0 the specific build number 36. Some versions may not have a build number and will appear as the version. For example, 6.1.0 indicates Fabric OS version 6.1.0.
swOperStatus 1.3.6.1.4.1.1588.2.1.1.1.1.7	Read only	The current operational status of the switch. Possible values are: ■ online (1) - The switch is accessible by an external Fibre Channel port. ■ offline (2) - The switch is not accessible. ■ testing (3) - The switch is in a built-in test mode and is not accessible by an external Fibre Channel port. ■ faulty (4) - The switch is not operational.

Object and OID	Access	Description
swAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.8	Read-write	The desired administrative status of the switch. A management station might place the switch in a desired state by setting this object accordingly. Possible values are: ■ online (1) - Sets the switch to be accessible by an external FC port. ■ offline (2) - Sets the switch to be inaccessible. ■ testing (3) - Sets the switch to run the built-in test. ■ faulty (4) - Sets the switch to a "soft" faulty condition. ■ reboot (5) - Sets the chassis to reboot in 1 second. ■ fastboot (6) - Sets the chassis to fastboot in 1 second. Fastboot causes the chassis to boot but omit the POST. When the switch is in the faulty state, only two states can be set: faulty and reboot/fastboot. For the Brocade 3250, 3850, 3900, 8000, 24000, 48000 and DCX director, the testing (3) and faulty (4) values are not applicable. The possible values for the Brocade 300, 5100 and 5300 are online (1) or offline (2).
swTelnetShellAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.9	Read-write	The desired administrative status of the Telnet shell. Setting this value to 1 (terminated), deletes the current Telnet shell task. When this variable instance is read, it reports the value last set through SNMP. This OID is supported in Fabric OS 2.x through 3.x. This OID is not supported in Fabric OS 4.0 through 4.2. This OID is supported in Fabric OS 4.3 and later versions. Possible values are: ■ unknown (0) - The status of the current Telnet shell task is unknown. ■ terminated (1) - The current Telnet shell task is deleted. By setting it to 1 (terminated), the current Telnet shell task is deleted. When this variable instance is read, it reports the value last set through SNMP. **NOTE:** This object is deprecated.
swSsn 1.3.6.1.4.1.1588.2.1.1.1.1.10	Read only	The soft serial number of the switch. This variable will return the "ssn" value that is stored in the config database. If the "ssn" key value pair is not in the config database, it will return the WWN of the switch.

Flash Administration

The next six objects are related to firmware or configuration file management. Due to security restrictions, firmware download and configuration file upload and download are not supported through SNMP.

Object and OID	Access	Description
swFlashDLOperStatus 1.3.6.1.4.1.1588.2.1.1.1.1.11	Read only	The operational status of the flash. This OID cannot be used for either Firmwaredownload or Configdownload (it cannot be set and is read only). The value displayed is always "swCurrent (1)".

Object and OID	Access	Description
swFlashDLAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.12	Read-write	The desired state of the flash. The host is specified in swFlashDLHost.0. In addition, the user name is specified in swFlashDLUser.0 and the file name specified in swFlashDLFile.0. Possible values are: ■ swCurrent (1) - The flash contains the current firmware image or configuration file. ■ swCfUpload (3) - The switch configuration file is to be uploaded to the host specified. ■ swCfDownload (4) - The switch configuration file is to be downloaded from the host specified. ■ swFwCorrupted (5) - The firmware in the flash is corrupted. This value is for informational purposes only; however, setting swFlashDLAdmStatus to this value is not allowed. For more information about the `firmwareDownload`, `configDownload`, and `configUpload` commands, refer to the *Brocade Fabric OS Command Reference Manual*.
swFlashDLHost 1.3.6.1.4.1.1588.2.1.1.1.1.13	Read-write	The name or IP address (in dot notation) of the host to download or upload a relevant file to the flash.
swFlashDLUser 1.3.6.1.4.1.1588.2.1.1.1.1.14	Read-write	The user name is used on the host for downloading or uploading a relevant file to or from the flash.
swFlashDLFile 1.3.6.1.4.1.1588.2.1.1.1.1.15	Read-write	The name of the file to be downloaded or uploaded.
swFlashDLPassword 1.3.6.1.4.1.1588.2.1.1.1.1.16	Read-write	The password to be used for FTP transfer of files in the download or upload operation.
swBeaconOperStatus 1.3.6.1.4.1.1588.2.1.1.1.1.18	Read only	The current operational status of the switch beacon. Possible values are: ■ on (1) - The LEDs on the front panel of the switch run alternately from left to right and right to left. The color is yellow. ■ off (2) - Each LED is in its regular status, indicating color and state.
swBeaconAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.1.19	Read-write	The desired status of the switch beacon. Possible values are: ■ on (1) - The LEDs on the front panel of the switch run alternately from left to right and right to left. Sets the color to yellow. ■ off (2) - Sets each LED to its regular status, indicating color and state.
swDiagResult 1.3.6.1.4.1.1588.2.1.1.1.1.20	Read only	The result of the power-on self test (POST) diagnostics. Possible values are: ■ sw-ok (1) - The switch is okay. ■ sw-faulty (2) - The switch has experienced an unknown fault. ■ sw-embedded-port-fault (3) - The switch has experienced an embedded port fault.

Object and OID	Access	Description
swNumSensors 1.3.6.1.4.1.1588.2.1.1.1.1.21	Read only	The number of sensors inside the switch. The Brocade DCX value is between 1 and 57 (temperature = 50, fan = 3, power supply = 4). The value might vary depending on the switch model.
swSensorTable 1.3.6.1.4.1.1588.2.1.1.1.1.22	Not accessible	Table of sensor entries. Table 5 lists the sensors on the Brocade switches. The sensors on the switches vary based on the blades. For the exact count of temperature sensors, see Table 6.
swSensorEntry 1.3.6.1.4.1.1588.2.1.1.1.1.22.1	Not accessible	An entry of the sensor information.
swSensorIndex 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.1	Read only	The index of the sensor. The values are 1 through the value in swNumSensors.
swSensorType 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.2	Read only	The type of sensor.
swSensorStatus 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.3	Read only	The current status of the sensor. Possible values are: ■ unknown (1) ■ faulty (2) ■ below-min (3) - The sensor value is below the minimum threshold. ■ nominal (4) ■ above-max (5) - The sensor value is above the maximum threshold. ■ absent (6) - The sensor is missing. For Temperature, valid values include 3 (below-min), 4 (nominal), and 5 (above-max). For Fan, valid values include 3 (below-min), 4 (nominal), and 6 (absent). For Power Supply, valid values include 2 (faulty), 4 (nominal), and 6 (absent).
swSensorValue 1.3.6.1.4.1.1588.2.1.1.1.1.22.1.4	Read only	The current value (reading) of the sensor. The value -2147483648 represents the maximum value of integer value; it also means that the sensor does not have the capability to measure the actual value. In v2.0, the temperature sensor value is in Celsius, the fan value is in RPM (revolutions per minute), and the power supply sensor reading is unknown. The unknown value -2147483648 indicates the maximum integer value.

swSensorInfo
1.3.6.1.4.1.1588.2.1.1.1.1.22.1.5
	Read only	Additional information on the sensor. It contains the sensor type and number, in textual format; for example:
		`SLOT #0: TEMP #3`
		`FAN #1`
		`Power Supply #1`

Object and OID	Access	Description
swTrackChangesInfo 1.3.6.1.4.1.1588.2.1.1.1.1.23	Read only	Track changes string; for traps only. If there are no events to track, the default return value is "No event so far." If there are events to track, the following are valid return values: ■ Successful login ■ Unsuccessful login ■ Logout ■ Configuration file change from task (name of task) ■ Track-changes on ■ Track-changes off **NOTE:** This object is obsoleted.
swID 1.3.6.1.4.1.1588.2.1.1.1.1.24	Read only	With a VF-enabled fabric, the number of switches will be 0 to 128.
swEtherIPAddress 1.3.6.1.4.1.1588.2.1.1.1.1.25	Read only	The IP address of the Ethernet interface of this switch.
swEtherIPMask 1.3.6.1.4.1.1588.2.1.1.1.1.26	Read only	The IP mask of the Ethernet interface of this switch.
swFCIPAddress 1.3.6.1.4.1.1588.2.1.1.1.1.27	Read only	The IP address of the FC interface of this switch.
swFCIPMask 1.3.6.1.4.1.1588.2.1.1.1.1.28	Read only	The IP mask of the FC interface of this switch.
swIPv6Address 1.3.6.1.4.1.1588.2.1.1.1.1.29	Not accessible	The IPv6 address. This object is not accessible.
swIPv6Status 1.3.6.1.4.1.1588.2.1.1.1.1.30	Not accessible	The current status of the IPv6 address. This object is not accessible.
swModel 1.3.6.1.4.1.1588.2.1.1.1.1.31	Read only	Indicates whether the switch is a 7500 or a 7500E.
swTestString 1.3.6.1.4.1.1588.2.1.1.1.1.32	Not accessible	Presence of this string represents a test trap.
swPortList 1.3.6.1.4.1.1588.2.1.1.1.1.33	Not accessible	This string represents the list of ports and the WWN when the ports are moved from one switch to another.
swBrcdTrapBitMask 1.3.6.1.4.1.1588.2.1.1.1.1.34	Not accessible	This represents the type of notification using a single bit. 0x01 - Fabric change event 0x02 - Device change event 0x04 - FAPWWN change event 0x08 - FDMI events 0x0A - Routing policy change 0x10 - D-Port configuraiton event 0x20 - SupportSave start/complete event 0x40 - Dynamic port name change 0x80 - Dynamic port name feature enable/disable

Object and OID	Access	Description
swFCPortPrevType 1.3.6.1.4.1.1588.2.1.1.1.1.35	Not accessible	This represents the port type of a port before it goes online or offline, and it is valid only in swFcPortSCN trap. Valid values are: ■ unknown (1) ■ other (2) ■ fl-port (3) - Public loop ■ f-port (4) - Fabric port ■ e-port (5) - Fabric expansion port ■ g-port (6) - Generic fabric port ■ ex-port (7) ■ d-port (8) - Diagnostic port ■ sim-port (9) - Port simulator port ■ ve-port (10) - Virtual E-Port ■ ae-port (11) - Analytics E-Port ■ af-port (12) - Analytics F-Port
swDeviceStatus 1.3.6.1.4.1.1588.2.1.1.1.1.36	Not accessible	This represents the status of the attached device. The status changes whenever the port or the node goes to an online or offline state.
swBrcdBitObjVal 1.3.6.1.4.1.1588.2.1.1.1.1.37	Not accessible	The object contains the object value for each change mentioned in the swBrcdGenericTrap. It will be empty for the events that do not have any value.
swIODState 1.3.6.1.4.1.1588.2.1.1.1.1.38	Read only	The object represents the IOD feature state. Possible values are: ■ 1 - enabled ■ 2 - disabled ■ 3 - unknown
swTelnetTable 1.3.6.1.4.1.1588.2.1.1.1.1.39	Not accessible	Table to display active Telnet sessions.
swTelnetEntry 1.3.6.1.4.1.1588.2.1.1.1.1.39.1	Not accessible	An entry for the swtelnet table.
swTelnetIndex 1.3.6.1.4.1.1588.2.1.1.1.1.39.1.1	Read only	This object indicates the index of Telnet sessions.
swTelnetUser 1.3.6.1.4.1.1588.2.1.1.1.1.39.1.2	Read only	This object indicates the user whose Telnet session is logged in.
swTelnetTTY 1.3.6.1.4.1.1588.2.1.1.1.1.39.1.3	Read only	This object indicates the terminal of the Telnet session.
swTelnetIdleTime 1.3.6.1.4.1.1588.2.1.1.1.1.39.1.4	Read only	This object indicates the idle time of the Telnet session.
swTelnetLoginTime 1.3.6.1.4.1.1588.2.1.1.1.1.39.1.5	Read only	This object indicates the login time of the Telnet session.
swTelnetIpaddress 1.3.6.1.4.1.1588.2.1.1.1.1.39.1.6	Read only	This object indicates the IP address from where the Telnet session exists. **NOTE:** If the "login from" field is "-", SNMP displays the object "swTelnetIpaddress" as "0.0.0.0".

Table 5: Sensors on the Various Brocade Switches

Platform	Temp	Fans	Power Supply	swNumSensors / connUnitNumSensors
Brocade 7800 Extension Switch	3 sensors	2 fans	2 PS	7
Brocade 6505	4 sensors	2 fans	2 PS	8
Brocade 6510	4 sensors	2 fans	2 PS	8
Brocade 6520	4 sensors	2 fans	2 PS	8
Brocade DCX	16+ sensors	3 fans	4 PS	23+
Brocade DCX-4S	16+ sensors	3 fans	4 PS	23+
Brocade DCX 8510-4	35+ sensors	2 fans	2 PS	39+
Brocade DCX 8510-8	58+ sensors	3 fans	4 PS	65+
Brocade G610	6 sensors	4 (a minimum of 2 must be working)	1	11
Brocade G620	7 sensors	6	2	13
Brocade G630	15 sensors	3 (a minimum of 2 must be working)	2	20
Brocade X6-4	35+ sensors	2	2	39+
Brocade X6-8	58+ sensors	3 fans	4 PS (3 minimum)	65+
Brocade VA-40	4 sensors	2 fans	2 PS	8

Table 6: Blade Table

Model	Temp Sensors
FC16-32	5
FC16-48	5
FC16-64	5
FC32-48	5
FC32-64	5
FX8-24	3
SX6	7

4.4 Switch Fabric Group

Object and OID	Access	Description
swFabric 1.3.6.1.4.1.1588.2.1.1.1.2	Not accessible	The OID subtree for the switch fabric group.
swDomainID 1.3.6.1.4.1.1588.2.1.1.1.2.1	Read-write	The current Fibre Channel domain ID of the switch. To set a new value, the switch (swAdmStatus) must be in the offline or testing state.
swPrincipalSwitch 1.3.6.1.4.1.1588.2.1.1.1.2.2	Read only	Indicates whether the switch is the principal switch. Possible values are: ■ yes (1) ■ no (2)
swNumNbs 1.3.6.1.4.1.1588.2.1.1.1.2.8	Read only	The number of inter-switch links (ISLs) in the (immediate) neighborhood.
swNbTable 1.3.6.1.4.1.1588.2.1.1.1.2.9	Not accessible	This table contains the ISLs in the immediate neighborhood of the switch.
swNbEntry 1.3.6.1.4.1.1588.2.1.1.1.2.9.1	Not accessible	An entry that contains each neighbors ISL parameters.
swNbIndex 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.1	Read only	The index for the neighborhood entry.
swNbMyPort 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.2	Read only	This is the port that has an ISL to another switch. This value is the same as the physical port number of the local switch plus one.
swNbRemDomain 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.3	Read only	This is the Fibre Channel domain on the other end of the ISL. This is the domain ID of the remote switch. Valid values are 1 through 239 as defined by FCS-SW.
swNbRemPort 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.4	Read only	This is the port index on the other end of the ISL. The physical port number of the remote switch, plus 1.
swNbBaudRate 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.5	Read only	The baud rate of the ISL. It is always unknown (0). Possible values are: ■ other (1) - None of the following. ■ oneEighth (2) - 155 Mbaud. ■ quarter (4) - 266 Mbaud. ■ half (8) - 532 Mbaud. ■ full (16) - 1 Gbaud. ■ double (32) - 2 Gbaud. ■ quadruple (64) - 4 Gbaud. ■ octuple (128) - 8 Gbaud. ■ decuple (256) - 10 Gbaud. ■ sexdecuple (512) - 16 Gbaud The valid values for the Brocade DCX are double (32), quadruple (64), and octuple (128).

Object and OID	Access	Description
swNbIslState 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.6	Read only	The current state of the ISL. The possible values are as follows. ■ 0 - ISL is down. ■ 1 - ISL is initiating and not yet operational. ■ 2, 3, 4, - Used for notification of internal states. ■ 5 - ISL is active.
swNbIslCost 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.7	Read-write	The current link cost of the ISL. In other words, the cost of a link to control the routing algorithm.
swNbRemPortName 1.3.6.1.4.1.1588.2.1.1.1.2.9.1.8	Read only	The WWN of the remote port.
swFabricMemTable 1.3.6.1.4.1.1588.2.1.1.1.2.10	Not accessible	This table contains information on the member switches of a fabric. Supported in Fabric OS 2.6.1 and not 3.2.0. This is not available in Fabric OS 6.2.0 and later releases.
swIDIDMode 1.3.6.1.4.1.1588.2.1.1.1.2.11	Read only	This identifies the status of Insistent Domain ID (IDID) mode. The status indicates whether IDID mode is enabled.
swPmgrEventType 1.3.6.1.4.1.1588.2.1.1.1.2.12	Not accessible	This indicates the partition manager event type. This OID identifies the following events: ■ create (0) ■ delete (1) ■ moveport (2) ■ fidchange (3) ■ basechange (4) ■ vfstatechange (5)
swPmgrEventTime 1.3.6.1.4.1.1588.2.1.1.1.2.13	Not accessible	This object identifies the date and time when any events mentioned in swPmgrEventType occur, in textual format.
swPmgrEventDescr 1.3.6.1.4.1.1588.2.1.1.1.2.14	Not accessible	This object identifies the textual description of the events mentioned in swPmgrEventType.
swVfId 1.3.6.1.4.1.1588.2.1.1.1.2.15	Read only	The virtual fabric ID of the switch. **NOTE:** swVfId in a switch fabric group is zero for a non-VF-supported platform, and in a VF-supported platform, it is the virtual fabric ID of the switch.
swVfName 1.3.6.1.4.1.1588.2.1.1.1.2.16	Read only	This represents the virtual switch name configured in the switch.

4.5 Switch Agent Configuration Group

Object and OID	Access	Description
swAgtCfg 1.3.6.1.4.1.1588.2.1.1.1.4	Not accessible	The OID subtree for switch agent configuration group.
swAgtCmtyTable 1.3.6.1.4.1.1588.2.1.1.1.4.11	Not accessible	A table that contains one entry for each community, the access control, and parameters of the community. The table displays all community strings (read and write) if it is accessed by the "write" community string. Only "read" community strings are displayed if it is accessed by the "read" community string. In Secure Fabric OS, the community strings can be modified on the primary switch only. **NOTE:** This table is deprecated in Fabric OS 7.0.0 and later. Use the tables snmpTargetAddrTable, snmpTargetParamsTable, snmpCommunityTable to get the required data.
swAgtCmtyEntry 1.3.6.1.4.1.1588.2.1.1.1.4.11.1	Not accessible	An entry containing the community parameters.
swAgtCmtyIdx 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.1	Read only	The SNMPv1 community entry. The return value for this entry is 1 through 6.
swAgtCmtyStr 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.2	Read-write	This is a community string supported by the agent. If a new value is set successfully, it takes effect immediately. Default values for communities are as follows: ■ 1 (Secret Code) ■ 2 (OrigEquipMfr) ■ 3 (private) ■ 4 (public) ■ 5 (common) ■ 6 (FibreChannel) Community strings 1 through 3 are read-write, and strings 4 through 6 are read only. You can change the community setting using the snmpconfig command.

Object and OID	Access	Description
swAgtTrapRcp 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.3	Read-write	This is the trap recipient associated with the community. If a new value is set successfully, it takes effect immediately.
		If not otherwise set, the default IP address for this trap recipient is 0.0.0.0 and the SNMP trap is not sent for the associated community string.
		With a setting of non-0.0.0.0 IP address, SNMP traps are sent to the host with the associated community string.
		Any or all of the trap recipients can be configured to send a trap for the associated community string. The maximum number of trap recipients that can be configured is six. If no trap recipient is configured, no traps are sent.
		The trap recipient IP address should be part of the Access Control List for Fabric OS (refer to the *Brocade Fabric OS Command Reference Manual* and the `snmpConfig` command for more information).
swAgtTrapSeverityLevel 1.3.6.1.4.1.1588.2.1.1.1.4.11.1.4	Read-write	This is the trap severity level associated with swAgtTrapRcp.
		The trap severity level, is in conjunction with the event's severity level. When an event occurs, and if its severity level is at or below the set value, the SNMP trap is sent to configure trap recipients. The severity level is limited to particular events. If a new value is set successfully, it takes effect immediately.
		This object obsoletes swEventTrapLevel.

4.6 Fibre Channel Port Group

This group contains information about the physical state, operational status, performance, and error statistics of each Fibre Channel port on the switch. A Fibre Channel port is one that supports the Fibre Channel protocol, such as an F_Port, E_Port, U_Port, or FL_Port.

Object and OID	Access	Description
swFCport 1.3.6.1.4.1.1588.2.1.1.1.6	Not accessible	The OID subtree for a Fibre Channel port group.
swFCPortCapacity 1.3.6.1.4.1.1588.2.1.1.1.6.1	Read only	The maximum number of physical FC ports on the switch.
swFCPortTable 1.3.6.1.4.1.1588.2.1.1.1.6.2	Not accessible	A table that contains one entry for each switch port, configuration, and service parameters of the port.
swFCPortEntry 1.3.6.1.4.1.1588.2.1.1.1.6.2.1	Not accessible	An entry containing the configuration and service parameters of the switch port.
swFCPortIndex 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.1	Read only	The switch port index. The value of swFCPortIndex is 1 higher than the actual port index. For example, a swFCPortIndex of 1 corresponds to the actual port index of 0.

Object and OID	Access	Description
swFCPortType 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.2	Read only	The type of ASIC for the switch port. Possible values are: - stitch (1) - flannel (2) - loom (3) (Brocade 2000 series) - bloom (4) (Valid value for Brocade 3250, 3850, 3900, 12000, 24000) - rdbloom (5) - wormhole (6) - other (7) (Valid value for Brocade 200E, 300, 4012, 4100, 4900, 5100, 5300, 7500, 7600, and 48000) - unknown (8)
swFCPortPhyState 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.3	Read only	The physical state of the port. Possible values are: - noCard (1) - No card is present in this switch slot. - noTransceiver (2) - No transceiver module in this port (Transceiver is the generic name for GBIC, SFP, and so on). - laserFault (3) - The module is signaling a laser fault (defective GBIC). - noLight (4) - The module is not receiving light. - noSync (5) - The module is receiving light but is out of sync. - inSync (6) - The module is receiving light and is in sync. - portFault (7) - The port is marked faulty (defective GBIC, cable, or device). - diagFault (8) - The port failed diagnostics (defective G_Port or FL_Port card or motherboard). - lockRef (9) - The port is locking to the reference signal. - validating (10) - The module is being validated. - invalidModule (11) - The module is invalid. - noSigDet (14) - No signal is detected in the port. - unknown (255) - The module is unknown.
swFCPortOpStatus 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.4	Read only	The operational status of the port. Possible values are: - unknown (0) - The port module is physically absent. - online (1) - User frames can be passed. - offline (2) - No user frames can be passed. - testing (3) - No user frames can be passed. - faulty (4) - The port module is physically faulty.
swFCPortAdmStatus 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.5	Read-write	The desired state of the port. A management station might place the port in a desired state by setting this object accordingly. Based on the port status, this OID returns one of the following: - Online - When the queried port is online. - Offline - When the queried port is offline. - Faulty - When the port is in the faulty state. The following values can be used to set this object: - Online - To change the port's state to Online. - Offline - To change the port's state to Offline.

Object and OID	Access	Description
swFCPortLinkState 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.6	Read-write	Indicates the link state of the port. When the port's link state changes, its operational status (swFCPortOpStatus) is affected. Possible values are: ■ enabled (1) - The port is allowed to participate in the FC-PH protocol with its attached port (or ports if it is in an FC-AL loop). ■ disabled (2) - The port is not allowed to participate in the FC-PH protocol with its attached ports. ■ loopback (3) - The port might transmit frames through an internal path to verify the health of the transmitter and receiver path.
swFCPortTxType 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.7	Read only	Indicates the media transmitter type of the port. Possible values are: ■ unknown (1) - Cannot determine the port driver. ■ lw (2) - Long wave laser. ■ sw (3) - Short wave laser. ■ ld (4) - Long wave LED. ■ cu (5) - Copper (electrical).
swFCPortTxWords 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.11	Read only	Counts the number of Fibre Channel words that the port has transmitted. You can convert words to bytes by multiplying this value by 4. **NOTE:** This object is obsolete.
swFCPortRxWords 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.12	Read only	Counts the number of Fibre Channel words that the port has received. You can convert words to bytes by multiplying this value by 4. **NOTE:** This object is obsolete.
swFCPortTxFrames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.13	Read only	Counts the number of Fibre Channel frames that the port has transmitted.
swFCPortRxFrames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.14	Read only	Counts the number of Fibre Channel frames that the port has received.
swFCPortRxC2Frames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.15	Read only	Counts the number of Class 2 frames that the port has received.
swFCPortRxC3Frames 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.16	Read only	Counts the number of Class 3 frames that the port has received.
swFCPortRxLCs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.17	Read only	Counts the number of link control frames that the port has received.
swFCPortRxMcasts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.18	Read only	Counts the number of multicast frames that the port has received.
swFCPortTooManyRdys 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.19	Read only	Counts the number of times that RDYs exceeds the frames received.
swFCPortNoTxCredits 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.20	Read only	Counts the number of times that the transmit credit has reached 0.
swFCPortRxEncInFrs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.21	Read only	Counts the number of encoding error or disparity error inside frames received.

Object and OID	Access	Description
swFCPortRxCrcs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.22	Read only	Counts the number of CRC errors detected for frames received.
swFCPortRxTruncs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.23	Read only	Counts the number of truncated frames that the port has received.
swFCPortRxTooLongs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.24	Read only	Counts the number of received frames that are too long.
swFCPortRxBadEofs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.25	Read only	Counts the number of received frames that have bad EOF delimiters.
swFCPortRxEncOutFrs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.26	Read only	Counts the number of encoding error or disparity error outside frames received.
swFCPortRxBadOs 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.27	Read only	Counts the number of invalid ordered sets received.
swFCPortC3Discards 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.28	Read only	Counts the number of Class 3 frames that the port has discarded.
swFCPortMcastTimedOuts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.29	Read only	Counts the number of multicast frames that have been timed out.
swFCPortTxMcasts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.30	Read only	Counts the number of multicast frames that have been transmitted.
swFCPortLipIns 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.31	Read only	Counts the number of loop initializations that have been initiated by attached loop devices.
swFCPortLipOuts 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.32	Read only	Counts the number of loop initializations that have been initiated by the port.
swFCPortLipLastAlpa 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.33	Read only	Indicates the physical address (AL_PA) of the loop device that initiated the last loop initialization.
swFCPortWwn 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.34	Read only	The WWN of the Fibre Channel port. The contents of an instance are in IEEE extended format, as specified in FC-PH.
swFCPortSpeed 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.35	Read-write	The desired baud rate for the port. **NOTE:** This object is obsoleted.
swFCPortName 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.36	Read only	A string that indicates the name of the addressed port. **NOTE:** The names should be persistent across switch reboots. Port names do not have to be unique within a switch or within a fabric.
swFCPortSpecifier 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.37	Read only	This string indicates the physical port number of the addressed port. This string can be entered as an argument in CLI commands such as `portShow` or wherever a physical port number is expected. The format of the string is: <slot/>port, 'slot' being present only for bladed systems. For LISL, the value is -1/<port #>.
swFCPortFlag 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.38	Read only	This string is a bit map of the port status flags, including the port type. ■ physical (0) ■ virtual (1)

Object and OID	Access	Description
swFCPortBrcdType 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.39	Read only	This string indicates the Brocade port type. Valid values: ■ unknown (1) ■ other (2) ■ fl-port (3) - Public loop ■ f-port (4) - Fabric port ■ e-port (5) - Fabric expansion port ■ g-port (6) - Generic fabric port ■ ex-port (7) ■ d-port (8) - Diagnostic port ■ sim-port (9) - Port simulator port ■ ve-port (10) - Virtual E_Port ■ ae-port (11) - Analytics E_Port ■ af-port (12) - Analytics F_Port
swFCPortDisableReason 1.3.6.1.4.1.1588.2.1.1.1.6.2.1.40	Not accessible	This string indicates the state change reason when a port goes from online to offline.

4.7 Name Server Database Group

Object and OID	Access	Description
swNs 1.3.6.1.4.1.1588.2.1.1.1.7	Not accessible	The OID subtree for the Name Server database group.
swNsLocalNumEntry 1.3.6.1.4.1.1588.2.1.1.1.7.1	Read only	The number of local Name Server entries.
swNsLocalTable 1.3.6.1.4.1.1588.2.1.1.1.7.2	Not accessible	The table of local Name Server entries.
swNsLocalEntry 1.3.6.1.4.1.1588.2.1.1.1.7.2.1	Not accessible	An entry from the local Name Server database.
swNsEntryIndex 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.1	Read only	The index of the Name Server database entry.
swNsPortID 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.2	Read only	The Fibre Channel port address ID of the entry.
swNsPortType 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.3	Read only	The type of port for this entry. Possible values, as defined in FC-GS-2, are: ■ nPort (1) ■ nlPort (2)
swNsPortName 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.4	Read only	The Fibre Channel WWN of the port entry.

Object and OID	Access	Description
swNsPortSymb 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.5	Read only	The contents of a symbolic name of the port entry. In FC-GS-2, a symbolic name consists of a byte array of 1 through 256 bytes, and the first byte of the array specifies the length of its contents. This object variable corresponds to the contents of the symbolic name, with the first byte removed.
swNsNodeName 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.6	Read only	The Fibre Channel WWN of the associated node, as defined in FC-GS-2.
swNsNodeSymb 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.7	Read only	The contents of a symbolic name of the node associated with the entry. In FC-GS-2, a symbolic name consists of a byte array of 1 through 256 bytes, and the first byte of the array specifies the length of its contents. This object variable corresponds to the contents of the symbolic name, with the first byte removed.
swNsIPA 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.8	Read only	The initial process associators of the node for the entry as defined in FC-GS-2. This value is read only and cannot be changed.
swNsIpAddress 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.9	Read only	The IP address of the node for the entry as defined in FC-GS-2. The format of the address is in IPv6.
swNsCos 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.10	Read only	The class of services supported by the port. This value is a hard-coded bitmap and indicates the supported services as follows: ■ Class F (1) ■ Class 1 (2) ■ Class F-1 (3) ■ Class 2 (4) ■ Class F-2 (5) ■ Class 1-2 (6) ■ Class F-1-2 (7) ■ Class 3 (8) ■ Class F-3 (9) ■ Class 1-3 (10) ■ Class F-1-3 (11) ■ Class 2-3 (12) ■ Class F-2-3 (13) ■ Class 1-2-3 (14) ■ Class F-1-2-3 (15)
swNsFc4 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.11	Read only	The FC-4s supported by the port, as defined in FC-GS-2.
swNsIpNxPort 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.12	Read only	The object identifies the IP address of the Nx_Port for the entry.
swNsWwn 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.13	Read only	The object identifies the World Wide Name (WWN) of the Fx_Port for the entry.
swNsHardAddr 1.3.6.1.4.1.1588.2.1.1.1.7.2.1.14	Read only	The object identifies the 24-bit hard address of the node for the entry.

4.8 Event Group

swEventTable identifies the error log messages by the switch. It can have a maximum of only 1024 entries.

Object and OID	Access	Description
swEvent 1.3.6.1.4.1.1588.2.1.1.1.8	Not accessible	The OID subtree for the switch event group.
swEventTrapLevel 1.3.6.1.4.1.1588.2.1.1.1.8.1	Read-write	Deprecated.
swEventNumEntries 1.3.6.1.4.1.1588.2.1.1.1.8.4	Read only	The number of entries in the event table. The value ranges from 0 to 1024.
swEventTable 1.3.6.1.4.1.1588.2.1.1.1.8.5	Not accessible	The table of event entries. The events are received from the chassis and the created logical switches. Only external RASlog messages are supported. These external messages are documented in the *Brocade Fabric OS Message Reference Manual.*
swEventEntry 1.3.6.1.4.1.1588.2.1.1.1.8.5.1	Not accessible	An entry of the event table.
swEventIndex 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.1	Read only	A unique number, the swEventIndex, that identifies each RASlog message. The swEventIndex shows the RASlog event index. The index value starts from 1.
swEventTimeInfo 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.2	Read only	The date and time that this event occurred. The return string is displayed using the following format: `YYYY/MM/DD-hh:mm:ss` Where: YYYY = Year MM = Month DD = Date hh = Hour mm = Minute ss = Seconds For example: 2005/12/05-07:33:41
swEventLevel 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.3	Read only	The severity level of this event entry. Possible values are: ■ critical (1) ■ error (2) ■ warning (3) ■ informational (4) ■ debug (5)
swEventRepeatCount 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.4	Read only	If the most recent event is the same as the previous, this number increments by 1, and is the count of consecutive times this particular event has occurred.

Object and OID	Access	Description
swEventDescr 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.5	Read only	A textual description of the event. This field uses the message title and number (for example, WEBD-1006) and the message text. For more information on error messages, refer to the *Brocade Fabric OS Message Reference Manual*.
swEventVfid 1.3.6.1.4.1.1588.2.1.1.1.8.5.1.6	Read only	This object identifies the virtual fabric ID.

4.9 Fabric Watch Group

NOTE: In Fabric OS 7.4.0 and later, the Fabric Watch feature is deprecated.

4.10 End Device Group

Object and OID	Access	Description
swEndDevice 1.3.6.1.4.1.1588.2.1.1.1.21	Not accessible	The OID subtree for the end device group.
swEndDeviceRlsTable 1.3.6.1.4.1.1588.2.1.1.1.21.1	Not accessible	The table of Read Link Error Status (RLS) for individual end devices.
swEndDeviceRlsEntry 1.3.6.1.4.1.1588.2.1.1.1.21.1.1	Not accessible	An entry of an individual end device's RLS. Since Brocade switches start with port number 0, the SNMP port number should be the physical port number plus one. Consequently SNMP port number 3 translates to port number 2.
swEndDevicePort 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.1	Not accessible	This object represents the port of the local switch to which the end device is connected. This is an obsolete entry and does not show any value.
swEndDeviceAlpa 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.2	Not accessible	This object represents the AL_PA of the end device. SNMP AL_PA number should be the logical AL_PA number plus 1. For example, SNMP AL_PA number 0xf0 translates to 0xef. This is an obsolete entry and does not show any value.
swEndDevicePortID 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.3	Read only	The Fibre Channel port address ID of the entry.
swEndDeviceLinkFailure 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.4	Read only	The link failure count for the end device.
swEndDeviceSyncLoss 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.5	Read only	The sync loss count for the end device.
swEndDeviceSigLoss 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.6	Read only	The signal loss count for the end device.
swEndDeviceProtoErr 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.7	Read only	The protocol error count for the end device.

Object and OID	Access	Description
swEndDeviceInvalidWord 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.8	Read only	The invalid word count for the end device.
swEndDeviceInvalidCRC 1.3.6.1.4.1.1588.2.1.1.1.21.1.1.9	Read only	The invalid CRC count for the end device.

4.11 Switch Group

The switch group is not supported.

Object and OID	Access	Description
swGroup 1.3.6.1.4.1.1588.2.1.1.1.22	Not accessible	The OID subtree for the switch group.
swGroupTable 1.3.6.1.4.1.1588.2.1.1.1.22.1	Not accessible	The table of groups. This is not available on all versions of Fabric OS.
swGroupEntry 1.3.6.1.4.1.1588.2.1.1.1.22.1.1	Not accessible	An entry in the table of groups.
swGroupIndex 1.3.6.1.4.1.1588.2.1.1.1.22.1.1.1	Read only	This object is the group index, starting from 1.
swGroupName 1.3.6.1.4.1.1588.2.1.1.1.22.1.1.2	Read only	This object identifies the name of the group. **NOTE:** This object is obsolete.
swGroupType 1.3.6.1.4.1.1588.2.1.1.1.22.1.1.3	Read only	This object identifies the type of the group. **NOTE:** This object is obsolete.
swGroupMemTable 1.3.6.1.4.1.1588.2.1.1.1.22.2	Not accessible	The table of members of all groups. This might not be available on all versions of Fabric OS.
swGroupMemEntry 1.3.6.1.4.1.1588.2.1.1.1.22.2.1	Not accessible	An entry for a member of a group.
swGroupID 1.3.6.1.4.1.1588.2.1.1.1.22.2.1.1	Read only	This object identifies the group ID of the member switch.
swGroupMemWwn 1.3.6.1.4.1.1588.2.1.1.1.22.2.1.2	Read only	This object identifies the WWN of the member switch.
swGroupMemPos 1.3.6.1.4.1.1588.2.1.1.1.22.2.1.	Read only	This object identifies the position of the member switch in the group, based on the order in which the switches were added in the group. **NOTE:** This object is obsolete.

4.12 Bloom Performance Monitor Group

NOTE: Beginning with Fabric OS 7.4.0 and later, the Bloom Performance Monitor feature is deprecated.

4.13 Trunking Group

Object and OID	Access	Description
swTrunk 1.3.6.1.4.1.1588.2.1.1.1.24	Not accessible	The OID subtree for the swTrunk group.
swSwitchTrunkable 1.3.6.1.4.1.1588.2.1.1.1.24.1	Not accessible	This object indicates whether the switch supports the trunking feature: ■ no (0) ■ yes (8)
swTrunkTable 1.3.6.1.4.1.1588.2.1.1.1.24.2	Not accessible	This object displays trunking information for the switch.
swTrunkEntry 1.3.6.1.4.1.1588.2.1.1.1.24.2.1	Not accessible	An entry for the trunking table.
swTrunkPortIndex 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.1	Read only	This object identifies the switch port index. The value of a port index is extracted from the second octet of the port WWN stored in swFCPortWwn (see swFCPortWwn) in the Fibre Channel port group).
swTrunkGroupNumber 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.2	Read only	This object is a logical entity that specifies the group number to which the port belongs. If this value is 0, the port is not trunked.
swTrunkMaster 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.3	Read only	The port number of the trunk master of the group. The trunk master implicitly defines the group. All ports with the same master are considered to be part of the same group.
swPortTrunked 1.3.6.1.4.1.1588.2.1.1.1.24.2.1.4	Read only	The active trunk status of the member port. Valid values: ■ enabled (1) ■ disabled (0)
swTrunkGrpTable 1.3.6.1.4.1.1588.2.1.1.1.24.3	Not accessible	The table displays trunking performance information for the switch.
swTrunkGrpEntry 1.3.6.1.4.1.1588.2.1.1.1.24.3.1	Not accessible	An entry for the trunking group table.
swTrunkGrpNumber 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.1	Read only	This object is a logical entity that specifies the group number to which the port belongs.
swTrunkGrpMaster 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.2	Read only	This object gives the master port ID for the trunk group.

Object and OID	Access	Description
swTrunkGrpTx 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.3	Read only	Gives the aggregate value of the transmitted words from this trunk group. **NOTE:** The syntax for this MIB variable is an octet string. The output is shown as a hexadecimal value. The value of swTrunkGrpTx is the 4-byte word transmitted in the TrunkGrp port. This value can be obtained through the CLI in the output of the `portStatsShow` command (stat_wtx value) for the corresponding trunk ports.
swTrunkGrpRx 1.3.6.1.4.1.1588.2.1.1.1.24.3.1.4	Read only	Gives the aggregate value of the received words by this trunk group. **NOTE:** The syntax for this MIB variable is an octet string. The output is shown as a hexadecimal value. The value of swTrunkGrpRx is the 4-byte word received in the TrunkGrp port. This value can be obtained through the CLI in the output of the `portStatsShow` command (stat_wrx value) for the corresponding trunk ports.

4.14 CPU or Memory Usage Group

The memory usage of a system indicates the system's RAM. This table is supported on MAPS-enabled switches.

Beginning with Fabric OS 8.0.1 and later, the CPU and memory usage objects listed in the following table are accessible in Access Gateway mode.

Object and OID	Access	Description
swCpuOrMemoryUsage 1.3.6.1.4.1.1588.2.1.1.1.26	Read only	The object identifier subtree for the CPU or memory usage group.
swCpuUsage 1.3.6.1.4.1.1588.2.1.1.1.26.1	Read only	The system's CPU usage.
swCpuNoOfRetries 1.3.6.1.4.1.1588.2.1.1.1.26.2	Read only	The number of times the system should take a CPU utilization sample before sending the CPU utilization trap.
swCpuUsageLimit 1.3.6.1.4.1.1588.2.1.1.1.26.3	Read only	The CPU usage limit. **NOTE:** This object is not supported on MAPS-enabled switches.
swCpuPollingInterval 1.3.6.1.4.1.1588.2.1.1.1.26.4	Read only	The time after which the next CPU usage value will be recorded.
swCpuAction 1.3.6.1.4.1.1588.2.1.1.1.26.5	Read only	The action to be taken if the CPU usage exceeds the specified threshold limit. **NOTE:** This object is not supported on MAPS-enabled switches.
swMemUsage 1.3.6.1.4.1.1588.2.1.1.1.26.6	Read only	The system's memory usage.
swMemNoOfRetries 1.3.6.1.4.1.1588.2.1.1.1.26.7	Read only	The number of times the system should take a memory usage sample before sending the MAPS trap that indicates the current memory usage.

Object and OID	Access	Description
swMemUsageLimit 1.3.6.1.4.1.1588.2.1.1.1.26.8	Read only	This OID specifies the total available memory of the system.
swMemPollingInterval 1.3.6.1.4.1.1588.2.1.1.1.26.9	Read only	The time after which the next memory usage sample will be taken.
swMemAction 1.3.6.1.4.1.1588.2.1.1.1.26.10	Read only	The action to be taken if the memory usage exceed the specified threshold limit. **NOTE:** This object is not supported on MAPS-enabled switches.
swMemUsageLimit1 1.3.6.1.4.1.1588.2.1.1.1.26.11	Read only	This OID specifies the low threshold value. **NOTE:** This object is not supported on MAPS-enabled switches.
swMemUsageLimit3 1.3.6.1.4.1.1588.2.1.1.1.26.12	Read only	This OID specifies the high threshold value. **NOTE:** This object is not supported on MAPS-enabled switches.
swMemFlashUsage 1.3.6.1.4.1.1588.2.1.1.1.26.13	Read only	This OID specifies the flash memory usage as a percentage value.

4.15 Switch Connectivity Unit Port Statistics Extension Table

This table is an extension of the connectivity unit port statistics table. This table can be queried only if the FA-MIB is enabled.

Object and OID	Access	Description
swConnUnitPortStatExtentionTable 1.3.6.1.4.1.1588.2.1.1.1.27	Not accessible	This table represents the connectivity unit port statistics. **NOTE:** This table is specific to an FC port, so the object instance of its corresponding Ethernet and FCoE port's object value will not display when you execute the `SNMP GET` or `SNMP WALK` command.
swConnUnitPortStatEntry 1.3.6.1.4.1.1588.2.1.1.1.27.1	Not accessible	This represents the connectivity unit port statistics.
swConnUnitCRCWithBadEOF 1.3.6.1.4.1.1588.2.1.1.1.27.1.1	Read only	The number of frames with a CRC error that has a bad EOF.
swConnUnitZeroTenancy 1.3.6.1.4.1.1588.2.1.1.1.27.1.2	Read only	This counter is incremented when the FL_Port acquires the loop, but does not transmit a frame.
swConnUnitFLNumOfTenancy 1.3.6.1.4.1.1588.2.1.1.1.27.1.3	Read only	This counter is incremented when the FL_Port acquires the loop.
swConnUnitNLNumOfTenancy 1.3.6.1.4.1.1588.2.1.1.1.27.1.4	Read only	This counter is incremented when the NL_Port acquires the loop.
swConnUnitStopTenancyStarVation 1.3.6.1.4.1.1588.2.1.1.1.27.1.5	Read only	This counter is incremented when the FL_Port cannot transmit a frame because of lack of credit.
swConnUnitOpend 1.3.6.1.4.1.1588.2.1.1.1.27.1.6	Read only	The number of times that the FC port entered the OPENED state.
swConnUnitTransferConnection 1.3.6.1.4.1.1588.2.1.1.1.27.1.7	Read only	The number of times that the FC port entered the TRANSFER state.

Object and OID	Access	Description
swConnUnitOpen 1.3.6.1.4.1.1588.2.1.1.1.27.1.8	Read only	The number of times that the FC port entered the OPEN state.
swConnUnitInvalidARB 1.3.6.1.4.1.1588.2.1.1.1.27.1.9	Read only	The number of times that the FC port received an invalid ARB.
swConnUnitFTB1Miss 1.3.6.1.4.1.1588.2.1.1.1.27.1.10	Read only	This counter is incremented when the port receives a frame with a DID that cannot be routed by FCR. Applicable to 8G platforms only.
swConnUnitFTB2Miss 1.3.6.1.4.1.1588.2.1.1.1.27.1.11	Read only	This counter is incremented when the port receives a frame with an SID/DID combination that cannot be routed by the VF module. Applicable to 8G platforms only.
swConnUnitFTB6Miss 1.3.6.1.4.1.1588.2.1.1.1.27.1.12	Read only	This counter is incremented when the port receives a frame with an SID that cannot be routed by FCR. Applicable to 8G platforms only.
swConnUnitZoneMiss 1.3.6.1.4.1.1588.2.1.1.1.27.1.13	Read only	This counter is incremented when the port receives a frame with an SID and DID that are not zoned together.
swConnUnitLunZoneMiss 1.3.6.1.4.1.1588.2.1.1.1.27.1.14	Read only	This counter is incremented when the port receives a frame with an SID, DID, and LUN that are not zoned together. This is not currently used.
swConnUnitBadEOF 1.3.6.1.4.1.1588.2.1.1.1.27.1.15	Read only	The number of frames with a bad EOF.
swConnUnitLCRX 1.3.6.1.4.1.1588.2.1.1.1.27.1.16	Read only	The number of link control frames received.
swConnUnitRDYPriority 1.3.6.1.4.1.1588.2.1.1.1.27.1.17	Read only	The number of times that sending R_RDY or VC_RDY primitive signals was a higher priority than sending frames, due to diminishing credit reserves in the transmitter at the other end of the fibre.
swConnUnitLli 1.3.6.1.4.1.1588.2.1.1.1.27.1.18	Read only	The number of low-level interrupts generated by the physical and link layer.
swConnUnitInterrupts 1.3.6.1.4.1.1588.2.1.1.1.27.1.19	Read only	The object represents all the interrupts received on a port. The interrupt includes LLI, unknown, and so on.
swConnUnitUnknownInterrupts 1.3.6.1.4.1.1588.2.1.1.1.27.1.20	Read only	This object represents the unknown interrupts received on a port.
swConnUnitTimedOut 1.3.6.1.4.1.1588.2.1.1.1.27.1.21	Read only	This object represents the number of frames that have timed out for any reason.
swConnUnitProcRequired 1.3.6.1.4.1.1588.2.1.1.1.27.1.22	Read only	This object represents the number of frames trapped by CPU.
swConnUnitTxBufferUnavailable 1.3.6.1.4.1.1588.2.1.1.1.27.1.23	Read only	This object shows the number of times that the port failed to transmit frames.
swConnUnitStateChange 1.3.6.1.4.1.1588.2.1.1.1.27.1.24	Read only	This object shows the count for the number of times that the port has gone to the offline, online, or faulty state.

Object and OID	Access	Description
swConnUnitC3DiscardDueToRX Timeout 1.3.6.1.4.1.1588.2.1.1.1.27.1.25	Read only	The number of Class 3 receive frames discarded due to a timeout.
swConnUnitC3DiscardDueTo DestUnreachable 1.3.6.1.4.1.1588.2.1.1.1.27.1.26	Read only	The number of Class 3 frames discarded due to destination unreachable.
swConnUnitC3DiscardDueToTXTime out 1.3.6.1.4.1.1588.2.1.1.1.27.1.27	Read only	The number of Class 3 transmit frames discarded due to a timeout.
swConnUnitC3DiscardOther 1.3.6.1.4.1.1588.2.1.1.1.27.1.28	Read only	The number of Class 3 frames discarded due to unknown reasons.
swConnUnitPCSErrorCounter 1.3.6.1.4.1.1588.2.1.1.1.27.1.29	Read only	The number of Physical Coding Sublayer (PCS) block errors.
swConnUnitUnroutableFrameCounter 1.3.6.1.4.1.1588.2.1.1.1.27.1.30	Read only	This object represents the number of unroutable frames.
swConnUnitFECCorrectedCounter 1.3.6.1.4.1.1588.2.1.1.1.27.1.31	Read only	This object indicates the Forward Error Correction (FEC) corrected block count. The FEC feature is applicable only on 10G and 16G platforms and is not supported on 32G platforms.
swConnUnitFECUnCorrectedCounter 1.3.6.1.4.1.1588.2.1.1.1.27.1.32	Read only	This object indicates the Forward Error Correction uncorrected blocks count. The FEC feature is applicable only on 16G and 32G platforms.
swConnUnitFECCorrectedRate 1.3.6.1.4.1.1588.2.1.1.1.27.1.33	Read only	This object indicates the Forward Error Correction rate. The FEC feature is applicable only on 32G platforms.

Chapter 5: MAPS-MIB Objects

5.1 MAPS-MIB Overview

The descriptions of the MIB variables in this chapter come directly from the bcsiModules. The notes that follow the descriptions typically pertain to Brocade-specific information as provided by Broadcom.

5.1.1 MAPS-MIB System Organization of MIB Objects

The following depict the organization and structure of the MAPS-MIB.

MAPS-MIB Overall Tree Structure

```
- iso
   - org
      - dod
         - internet
            - private
               - enterprises
                  - bcsi
                     - bcsiReg
                        - bcsiModules
                                 - bcsiModculeTC
                                 - swMibModule
                                 - maps
                                     - mapsTraps
                                     - mapsConfig
```

mapsTraps Hierarchy

```
- mapsTraps 1.3.6.1.4.1.1588.3.1.4.0
   - mapsTrapAM 1.3.6.1.4.1.1588.3.1.4.0.1
```

mapsConfig Hierarchy

```
- mapsConfig 1.3.6.1.4.1.1588.3.1.4.1
   - mapsConfigRuleName 1.3.6.1.4.1.1588.3.1.4.1.1
   - mapsConfigCondition 1.3.6.1.4.1.1588.3.1.4.1.2
   - mapsConfigNumOfMS 1.3.6.1.4.1.1588.3.1.4.1.3
   - mapsConfigMsName 1.3.6.1.4.1.1588.3.1.4.1.4
   - mapsConfigObjectGroupType 1.3.6.1.4.1.1588.3.1.4.1.5
   - mapsConfigObjectKeyType 1.3.6.1.4.1.1588.3.1.4.1.6
   - mapsConfigObjectKeyValue 1.3.6.1.4.1.1588.3.1.4.1.7
   - mapsConfigValueType 1.3.6.1.4.1.1588.3.1.4.1.8
   - mapsConfigCurrentValue 1.3.6.1.4.1.1588.3.1.4.1.9
   - mapsConfigTimeBase 1.3.6.1.4.1.1588.3.1.4.1.10
   - mapsConfigSeverityLevel 1.3.6.1.4.1.1588.3.1.4.1.11
   - mapsConfigMsList 1.3.6.1.4.1.1588.3.1.4.1.12
   - mapsConfigAction 1.3.6.1.4.1.1588.3.1.4.1.13
```

5.2 MAPS Traps

The OID represents the MAPS Alerting and Monitoring traps.

Trap Name and OID	Variables	Description
mapsTrapAM 1.3.6.1.4.1.1588.3.1.4.0.1	mapsConfigRuleName mapsConfigObjectGroupType mapsConfigObjectKeyType mapsConfigObjectKeyValue mapsConfigNumOfMS mapsConfigMsList mapsConfigSeverityLevel mapsConfigCondition mapsConfigAction swVfId mapsDbCategory mapsRuleTriggerCount mapsLastRuleExecTime mapsQuietTime **NOTE:** Beginning with Fabric OS 8.1.0 and later, the mapsRuleTriggerCount, mapsLastRuleExecTime, and mapsQuietTime OIDs are deprecated from var-binds of the trap.	This Alerting and Monitoring trap is sent for MAPS threshold events.

The OID represents the MAPS QuietTime traps.

Trap Name and OID	Variables	Description
mapsQuietTimeTrap 1.3.6.1.4.1.1588.3.1.4.0.2	mapsConfigRuleName mapsConfigObjectGroupType mapsConfigObjectKeyType mapsConfigObjectKeyValue mapsConfigNumOfMS mapsConfigMsList mapsConfigSeverityLevel mapsConfigCondition mapsConfigAction swVfId mapsDbCategory mapsRuleTriggerCount mapsLastRuleExecTime	This trap is sent for MAPS upon quiet time (QT) expiration.

5.3 MAPS Configuration

The OID represents the MAPS configuration.

Object and OID	Access	Description
mapsConfig	—	This object represents the MAPS configuration parameters.
mapsConfigRuleName 1.3.6.1.4.1.1588.3.1.4.1.1	Read only	This object indicates the rule name which associates a condition with actions that must be triggered when the specified condition is evaluated to be true.
mapsConfigCondition 1.3.6.1.4.1.1588.3.1.4.1.2	Read only	This object indicates the condition defined in the rule. It includes the counter, time base, and threshold value with the logical operation that must be evaluated. For example, (CRC/MIN > 10).
mapsConfigNumOfMS 1.3.6.1.4.1.1588.3.1.4.1.3	Read only	This object indicates the number of monitoring system entries in the notifications.
mapsConfigMsName 1.3.6.1.4.1.1588.3.1.4.1.4	Read only	This object indicates the monitoring system name like CRC, ITW, PS, FAN.
mapsConfigObjectGroupType 1.3.6.1.4.1.1588.3.1.4.1.5	Read only	This object indicates the object group type like circuit, PS, FAN.
mapsConfigObjectKeyType 1.3.6.1.4.1.1588.3.1.4.1.6	Read only	This object indicates the object key type. The object helps the NMS applications to interpret the data easily. For example, if the mapsConfigObjectGroupType is port, then the key type is an integer, and the key value is the port number.
mapsConfigObjectKeyValue 1.3.6.1.4.1.1588.3.1.4.1.7	Read only	This object indicates the object key value. For example: ■ For integer, the value is 1, 2, 3, 4, ... ■ For string, the value is flowname1, flowname2, ... ■ If the group type is port, the object key value is the port number.
mapsConfigValueType 1.3.6.1.4.1.1588.3.1.4.1.8	Read only	This object indicates the value type, which can be an integer, float, or string. The object helps NMS applications to interpret data easily.
mapsConfigCurrentValue 1.3.6.1.4.1.1588.3.1.4.1.9	Read only	This object indicates the actual value of the monitoring system.
mapsConfigTimeBase 1.3.6.1.4.1.1588.3.1.4.1.10	Read only	This object indicates the time period during which the change in a counter is to be monitored.
mapsConfigSeverityLevel 1.3.6.1.4.1.1588.3.1.4.1.11	Read only	This object indicates the severity level of the condition triggered.
mapsConfigMsList 1.3.6.1.4.1.1588.3.1.4.1.12	Read only	This object indicates the list of monitoring systems. The format is <msname>, <value-type>, <current-value>.

Object and OID	Access	Description
mapsConfigAction 1.3.6.1.4.1.1588.3.1.4.1.13	Read only	This object indicates the actions (bitmask value) that must be triggered when the specified condition is evaluated to be true. Action bitmask value mappings are: none (0) raslog (1) snmp (2) portlog (4) port-fence (8) email (16) hareboot (32) switchpolicy (64) For example, the mapsConfigAction value 3 represents both RASLog and SNMP actions.
mapsRuleTriggerCount 1.3.6.1.4.1.1588.3.1.4.1.15	Read only	This object indicates the number of times a rule trigger in quiet time.
mapsLastRuleExecTime 1.3.6.1.4.1.1588.3.1.4.1.16	Read only	This object indicates the last rule execution time.
mapsQuietTime 1.3.6.1.4.1.1588.3.1.4.1.17	Read only	This object indicates the quiet time configured in the rule.
mapsConfigObjectNewKeyValue 1.3.6.1.4.1.1588.3.1.4.1.18	Read only	This object replaces the mapsConfigObjectKeyValue OID. The new OID is an enhanced version of the deprecated one. The OID is inline with other alerts (RASLOG, EMAIL) and has the following formats: F-Port 1, Flow(<flow details), and so on.

Chapter 6: High-Availability MIB Objects

6.1 HA-MIB Overview

The HA-MIB provides information about the High Availability features of Fabric OS 6.3.0 and later.

The object types in HA-MIB are organized into the following groupings, and the descriptions of each of these MIB variables come directly from the HA-MIB itself:

- High-Availability group
- HA-MIB traps

The following depict the organization and structure of the HA-MIB file system.

HA-MIB Overall Tree Structure

```
- iso
   - org
      - dod
         - internet
            - private
               - enterprises
                  - bcsi
                     - commDev
                        - fibreChannel
                           - haMIB
                              - highAvailability
                              - haMIBTraps
```

haMIB and haMIBTraps Hierarchy

```
- haMIB (1.3.6.1.4.1.1588.2.1.2)
   - highAvailability (1.3.6.1.4.1.1588.2.1.2.1)
       - haStatus 1.3.6.1.4.1.1588.2.1.2.1.1
       - fruTable 1.3.6.1.4.1.1588.2.1.2.1.5
          - fruEntry 1.3.6.1.4.1.1588.2.1.2.1.5.1
              - fruClass 1.3.6.1.4.1.1588.2.1.2.1.5.1.1
              - fruStatus 1.3.6.1.4.1.1588.2.1.2.1.5.1.2
              - fruObjectNum 1.3.6.1.4.1.1588.2.1.2.1.5.1.3
              - fruSupplierId 1.3.6.1.4.1.1588.2.1.2.1.5.1.4
              - fruSupplierPartNum 1.3.6.1.4.1.1588.2.1.2.1.5.1.5
              - fruSupplierSerialNum 1.3.6.1.4.1.1588.2.1.2.1.5.1.6
              - fruSupplierRevCode 1.3.6.1.4.1.1588.2.1.2.1.5.1.7
       - fruHistoryTable 1.3.6.1.4.1.1588.2.1.2.1.6
          - fruHistoryEntry 1.3.6.1.4.1.1588.2.1.2.1.6.1
              - fruHistoryIndex 1.3.6.1.4.1.1588.2.1.2.1.6.1.1
              - fruHistoryClass 1.3.6.1.4.1.1588.2.1.2.1.6.1.2
              - fruHistoryObjectNum 1.3.6.1.4.1.1588.2.1.2.1.6.1.3
              - fruHistoryEvent 1.3.6.1.4.1.1588.2.1.2.1.6.1.4
              - fruHistoryTime 1.3.6.1.4.1.1588.2.1.2.1.6.1.5
              - fruHistoryFactoryPartNum 1.3.6.1.4.1.1588.2.1.2.1.6.1.6
              - fruHistoryFactorySerialNum 1.3.6.1.4.1.1588.2.1.2.1.6.1.7
       - cpTable 1.3.6.1.4.1.1588.2.1.2.1.7
          - cpEntry 1.3.6.1.4.1.1588.2.1.2.1.7.1
              - cpStatus 1.3.6.1.4.1.1588.2.1.2.1.7.1.1
              - cpIpAddress 1.3.6.1.4.1.1588.2.1.2.1.7.1.2
              - cpIpMask 1.3.6.1.4.1.1588.2.1.2.1.7.1.3
              - cpIpGateway 1.3.6.1.4.1.1588.2.1.2.1.7.1.4
              - cpLastEvent 1.3.6.1.4.1.1588.2.1.2.1.7.1.5
   - haMIBTraps
       - haMIBTrapPrefix (1.3.6.1.4.1.1588.2.1.2.2.0)
           - fruStatusChanged 1.3.6.1.4.1.1588.2.1.2.2.0.1
           - cpStatusChanged 1.3.6.1.4.1.1588.2.1.2.2.0.2
           - fruHistoryTrap 1.3.6.1.4.1.1588.2.1.2.2.0.3
```

The following table lists the objects or definitions that are imported into the HA-MIB and the modules from which they are imported.

Objects Imported into the HA-MIB

Object	Imported from This Module
MODULE-IDENTITY	SNMPv2-SMI
OBJECT-TYPE	
NOTIFICATION-TYPE	
TimeTicks	
Integer32	
IpAddress	
mib-2	
fibrechannel	SW-MIB
entPhysicalIndex	ENTITY-MIB
entPhysicalName	

Objects Imported into the HA-MIB (Continued)

Object	Imported from This Module
DisplayString	SNMPv2-TC
TimeStamp	

6.2 High-Availability Group

This section describes the MIB objects in the High-Availability group.

Object and OID	Access	Description
haStatus 1.3.6.1.4.1.1588.2.1.2.1.1	Read only	Indicates whether the system is redundant. Possible values are: ■ redundant (0) dual CP with standby CP ready to take over. ■ nonredundant (1) Single or Dual CP system where the standby CP is not available to take over operation of the switch.

6.3 FRU Table

Object and OID	Access	Description
fruTable 1.3.6.1.4.1.1588.2.1.2.1.5	Not accessible	This table inventories the field-replaceable unit (FRU) slots available. This table contains an entry for each entry in the entPhysicalTable that has entPhysicalClass set to "Container (5)" and a child entry that has entPhysicalIsFRU set to "true (1)". In Fabric OS, the chassis is marked as an FRU. Unlike other FRUs, the chassis FRU does not have a corresponding container entry. Table 7 includes information on all FRUs except the chassis.
fruEntry 1.3.6.1.4.1.1588.2.1.2.1.5.1	Not accessible	An entry for FRU slot in the fruTable.
fruClass 1.3.6.1.4.1.1588.2.1.2.1.5.1.1	Read only	The type of the FRU object that this slot can hold. ■ other (1) ■ unknown (2) ■ chassis (3) ■ cp (4) ■ other-CP (5) ■ switchblade (6) ■ wwn (7) ■ powerSupply (8) ■ fan (9) ■ CoreBlade (10) ■ ApplicationBlade (11)

Object and OID	Access	Description
fruStatus 1.3.6.1.4.1.1588.2.1.2.1.5.1.2	Read only	The current status of the FRU object in the slot. Valid values: ■ other (1) ■ unknown (2) ■ on (3) ■ off (4) ■ faulty (5)
fruObjectNum 1.3.6.1.4.1.1588.2.1.2.1.5.1.3	Read only	The slot number of the blade, and the unit number for everything else.
fruSupplierId 1.3.6.1.4.1.1588.2.1.2.1.5.1.4	Read only	The supplier ID.
fruSupplierPartNum 1.3.6.1.4.1.1588.2.1.2.1.5.1.5	Read only	The supplier part number.
fruSupplierSerialNum 1.3.6.1.4.1.1588.2.1.2.1.5.1.6	Read only	The supplier serial number.
fruSupplierRevCode 1.3.6.1.4.1.1588.2.1.2.1.5.1.7	Read only	The supplier revision code.
fruPowerConsumption 1.3.6.1.4.1.1588.2.1.2.1.5.1.8	Read only	The power consumption of the switch blades.

Table 7: Valid FRU Counts for the Various Brocade Switches

Platform	Blades	Fans	Power Supply	WWN Card
Brocade 300	NA	3 fans	1 PS	NA
Brocade 5100	NA	2 fans	2 PS	NA
Brocade 5300	NA	3 fans	2 PS	NA
Brocade 6505	1	2 fans	2 PS	1 WWN
Brocade 6510	1	2 fans	2 PS	1 WWN
Brocade 6520	1	2 fans	2 PS	1 WWN
Brocade 7800 Extension Switch	NA	2 fans	2 PS	NA
Brocade DCX	8 port blades 2 CP blades	3 fans	4 PS	2 WWNs
Brocade DCX-4S	4 port blades 2 CP blades	2 fans	4 PS	2 WWNs
Brocade DCX 8510-8 Backbone	8 port blades 2 CP blades	3 fans	4 PS	2 WWNs
Brocade DCX 8510-4 Backbone	4 port blades 2 CP blades	2 fans	4 PS	2 WWNs
Brocade G620	NA	2 fans	2 PS	1 WWN
Brocade VA-40FC	NA	2 FRUs	2 PS	NA

Table 7: Valid FRU Counts for the Various Brocade Switches (Continued)

Platform	Blades	Fans	Power Supply	WWN Card
Brocade X6-4	4 port blades 2 core blades 2 CP blades	2 fans	2 PS	2 WWNs
Brocade X6-8	8 port blades 2 core blades 2 CP blades	3 fans	4 PS	2 WWNs

6.4 FRU History Table

Object and OID	Access	Description
fruHistoryTable 1.3.6.1.4.1.1588.2.1.2.1.6	Not accessible	This table gives the contents of the entire history log of FRU events.
fruHistoryEntry 1.3.6.1.4.1.1588.2.1.2.1.6.1	Not accessible	An entry in this table represents a particular FRU event.
fruHistoryIndex 1.3.6.1.4.1.1588.2.1.2.1.6.1.1	Read only	Index of the FRU event in the history table.
fruHistoryClass 1.3.6.1.4.1.1588.2.1.2.1.6.1.2	Read only	The type of the FRU object related to the event. Valid values: ■ other (1) ■ unknown (2) ■ chassis (3) ■ cp (4) ■ other-CP (5) ■ switchblade (6) ■ wwn (7) ■ powerSupply (8) ■ fan (9) ■ CoreBlade (10) ■ ApplicationBlade (11)
fruHistoryObjectNum 1.3.6.1.4.1.1588.2.1.2.1.6.1.3	Read only	The slot number of the blade and the unit number for everything else.
fruHistoryEvent 1.3.6.1.4.1.1588.2.1.2.1.6.1.4	Read only	The type of the FRU event. Valid values: ■ added (1) ■ removed (2) ■ invalid (3)
fruHistoryTime 1.3.6.1.4.1.1588.2.1.2.1.6.1.5	Read only	The time at which this event happened.
fruHistoryFactoryPartNum 1.3.6.1.4.1.1588.2.1.2.1.6.1.6	Read only	The Brocade part number of the FRU object.
fruHistoryFactorySerialNum 1.3.6.1.4.1.1588.2.1.2.1.6.1.7	Read only	The Brocade serial number of the FRU object.

6.5 CP Table

Object and OID	Access	Description
cpTable 1.3.6.1.4.1.1588.2.1.2.1.7	Not accessible	This table lists all the CPs in the system.
cpEntry 1.3.6.1.4.1.1588.2.1.2.1.7.1	Not accessible	An entry represents a single CP in the system.
cpStatus 1.3.6.1.4.1.1588.2.1.2.1.7.1.1	Read only	The current status of the CP. Valid values: ■ other (1) ■ unknown (2) ■ active (3) ■ standby (4) ■ failed (5)
cpIpAddress 1.3.6.1.4.1.1588.2.1.2.1.7.1.2	Read only	The IP address of the Ethernet interface of this CP.
cpIpMask 1.3.6.1.4.1.1588.2.1.2.1.7.1.3	Read only	The IP mask of the Ethernet interface of this CP.
cpIpGateway 1.3.6.1.4.1.1588.2.1.2.1.7.1.4	Read only	The IP address of the IP gateway for this CP.
cpLastEvent 1.3.6.1.4.1.1588.2.1.2.1.7.1.5	Read only	The last event related to this CP. Valid values: ■ other (1) ■ unknown (2) ■ haSync (3) ■ haOutSync (4) ■ cpFaulty (5) ■ cpHealthy (6) ■ cpActive (7) ■ configChange (8) ■ failOverStart (9) ■ failOverDone (10) ■ firmwareCommit (11) ■ firmwareUpgrade (12)

6.6 BP Table

Object and OID	Access	Description
bpTable 1.3.6.1.4.1.1588.2.1.2.1.8	Not accessible	This table lists all the blade processor entries.
bpEntry 1.3.6.1.4.1.1588.2.1.2.1.8.1	Not accessible	An entry of the blade processor information.

Object and OID	Access	Description
bpStatus 1.3.6.1.4.1.1588.2.1.2.1.8.1.1	Read only	The current status of the BP. Valid values: ■ on (1) ■ off (2) ■ faulty (3) ■ unknow (4) ■ others (5)
bpeth0IpAddress 1.3.6.1.4.1.1588.2.1.2.1.8.1.2	Read only	The IP address of the Eth0 interface of the Scimitar blade.
bpeth1IpAddress 1.3.6.1.4.1.1588.2.1.2.1.8.1.3	Read only	The IP address of the Eth1 interface of the Scimitar blade.
bpsubNetMaskIpaddress 1.3.6.1.4.1.1588.2.1.2.1.8.1.4	Read only	The IP mask of the Ethernet interface of this CP.
bpIpGateway 1.3.6.1.4.1.1588.2.1.2.1.8.1.5	Read only	The IP address of the IP Gateway for this CP.
bpSasPriVersion 1.3.6.1.4.1.1588.2.1.2.1.8.1.6	Read only	The current primary version of the Storage Application Service (SAS).
bpSasSecVersion 1.3.6.1.4.1.1588.2.1.2.1.8.1.7	Read only	The current secondary version of the SAS.

6.7 HA-MIB Traps

This section lists the HA-MIB traps.

Trap Name and OID	Variables	Description
fruStatusChanged 1.3.6.1.4.1.1588.2.1.2.2.0.1	entPhysicalName fruStatus fruClass fruObjectNum	This trap is generated under the following events: ■ When the FRU is added, is removed, or fails ■ When the FRU is powered on or off ■ When the switch is rebooted ■ When there is a fault in the blade

Trap Name and OID	Variables	Description
cpStatusChanged 1.3.6.1.4.1.1588.2.1.2.2.0.2	cpStatus cpLastEvent swID swSsn	This trap is sent when the status of any CP object changes. The cpLastEvent variable provides the information about the event that occurred. Some of the triggers that generate this trap are: ■ Reboot ■ Firmware download ■ Fast boot ■ HA failover
fruHistoryTrap 1.3.6.1.4.1.1588.2.1.2.2.0.3	fruHistoryClass fruHistoryObjectNum fruHistoryEvent fruHistoryTime fruHistoryFactoryPartNum fruHistoryFactorySerialNum	This trap is generated when an FRU is added, is removed, or fails.

Chapter 7: FICON MIB Objects

7.1 FICON MIB Overview

The FICON MIB module (LINK-INCIDENT-MIB) defines support for FICON in Fabric OS. This MIB addresses link incident and link failure data for FICON hosts and devices connected to a Brocade switch.

The object types in the FICON MIB are organized into the following groupings, and the descriptions of these MIB variables come directly from the FICON MIB:

- Request Node Identification Data (RNID)
- Link Incident Record Registration (LIRR)
- Registered Link Incident Report (RLIR)
- Traps

7.1.1 SNMP Traps for FICON

SNMP traps for FICON are generated when the following occurs:

- A FICON device is added to the switch.
- A FICON device is removed from the switch.
- A new "listener" is added (once the LIRR handshake is complete).
- A "listener" entry is deleted.
- A link incident occurs.

7.1.2 FICON MIB System Organization of MIB Objects

The following depict the organization and structure of the FICON MIB file system.

Overall Tree Structure for the FICON MIB (linkIncidentMIB)

```
- iso
   - org
      - dod
         - internet
            - private
               - enterprises
                  - bcsi
                     - commDev
                        - fibreChannel
                           - fcSwitch
                              - linkIncidentMIB
                                 - ficonRNID
                                 - ficonLIRR
                                 - ficonRLIR
                                 - linkIncidentMIBTraps
```

linkIncidentMIB Hierarchy

```
- linkIncidentMIB
   - ficonRNID
      - nodeRNIDTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.2.1
      - nodeRNIDTable 1.3.6.1.4.1.1588.2.1.1.50.2.2
         - nodeRNIDEntry 1.3.6.1.4.1.1588.2.1.1.50.2.2.1
            - nodeRNIDIndex 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.1
            - nodeRNIDIncidentPortWWN 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.2
            - nodeRNIDPID 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.3
            - nodeRNIDFlags 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.4
            - nodeRNIDType 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.5
            - nodeRNIDModel 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.6
            - nodeRNIDManufacturer 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.7
            - nodeRNIDManufacturerPlant 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.8
            - nodeRNIDSequenceNumber 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.9
            - nodeRNIDConnectedPortWWN 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.10
            - nodeRNIDPortType 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.11
            - nodeRNIDFormat 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.12
            - nodeRNIDTag 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.13
            - nodeRNIDParams 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.14
      - switchRNIDTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.2.3
      - switchRNIDTable 1.3.6.1.4.1.1588.2.1.1.50.2.4
         - switchRNIDEntry 1.3.6.1.4.1.1588.2.1.1.50.2.4.1
            - switchRNIDIndex 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.1
            - switchRNIDSwitchWWN 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.2
            - switchRNIDFlags 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.3
            - switchRNIDType 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.4
            - switchRNIDModel 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.5
            - switchRNIDManufacturer 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.6
            - switchRNIDManufacturerPlant 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.7
            - switchRNIDSequenceNumber 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.8
            - switchRNIDTag 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.9
            - switchRNIDParams 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.10
      - nodeVfId 1.3.6.1.4.1.1588.2.1.1.50.2.5
   - ficonLIRR
      - LIRRTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.3.1
      - LIRRTable 1.3.6.1.4.1.1588.2.1.1.50.3.2
         - LIRREntry 1.3.6.1.4.1.1588.2.1.1.50.3.2.1
            - LIRRIndex 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.1
            - LIRRListenerPortWWN 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.2
```

```
               - LIRRListenerPID 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.3
               - LIRRRegType 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.4
               - LIRRProtocol 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.5
               - LIRRPortType 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.6
               - LIRRFormat 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.7
       - ficonRLIR
           - rLIRTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.4.1
           - rLIRTable 1.3.6.1.4.1.1588.2.1.1.50.4.2
               - rLIREntry 1.3.6.1.4.1.1588.2.1.1.50.4.2.1
                   - rLIRIndex 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.1
                   - rLIRIncidentPortWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.2
                   - rLIRIncidentNodeWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.3
                   - rLIRIncidentPortType 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.5
                   - rLIRIncidentPID 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.6
                   - rLIRIncidentPortNumber 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.7
                   - rLIRConnectedPortWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.8
                   - rLIRConnectedNodeWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.9
                   - rLIRFabricWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.10
                   - rLIRLinkFailureType 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.11
                   - rLIRTimeStamp 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.12
                   - rLIRFormat 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.13
```

linkIncidentMIBTraps Hierarchy

```
   - linkIncidentMIBTraps
       - linkIncidentMIBTrapPrefix
           - linkRNIDDeviceRegistration 1.3.6.1.4.1.1588.2.1.1.50.21.0.1
           - linkRNIDDeviceDeRegistration 1.3.6.1.4.1.1588.2.1.1.50.21.0.2
           - linkLIRRListenerAdded 1.3.6.1.4.1.1588.2.1.1.50.21.0.3
           - linkLIRRListenerRemoved 1.3.6.1.4.1.1588.2.1.1.50.21.0.4
           - linkRLIRFailureIncident 1.3.6.1.4.1.1588.2.1.1.50.21.0.5
```

7.1.3 Textual Conventions

Table 8 lists the textual conventions for the FICON MIB.

Table 8: FICON MIB Textual Conventions

Name	Status	Description	Syntax
LIRRProtocol	Current	The LIRR protocol.	INTEGER { fcp (1), sb2 (2) }
FcPortID	Current	The Fibre Channel address ID, a 24-bit value unique within the address space of a fabric.	OCTET STRING (SIZE (3))
RNIDModel	Current	The value of the model number.	OCTET STRING (SIZE (3))

Table 8: FICON MIB Textual Conventions (Continued)

Name	Status	Description	Syntax
RLIRLinkFailureType	Current	The link failure type.	INTEGER { bitErrorRate(2), lossOfSignal(3), nOSRecognized(4), primitiveSequenceTimeout(5), invalidSeqForPortState(6), loopInitializationTimeout(7), lossOfSignalInLoopInit(8) }
RNIDManufacturer	Current	The manufacturer name or code.	OCTET STRING (SIZE (3))
RNIDTagType	Current	The value of the RNID tag, in hexadecimal format. Note: Includes DISPLAY-HINT "x".	OCTET STRING (SIZE (2))
LinkWwn	Current	The link WWN.	OCTET STRING (SIZE (8))
RegType	Current	The RNID registration type.	INTEGER { conditional (1), unconditional (2) }
RNIDSequenceNumber	Current	The sequence number of the self-describing node.	OCTET STRING (SIZE (12))
RNIDManufacturerPlant	Current	The manufacturer plant name or code.	OCTET STRING (SIZE (2))
RNIDParams	Current	The value of the parameter.	OCTET STRING (SIZE (3))
PortType	Current	The port type.	INTEGER { n-port (1), nl-port (2), e-port (3) }
RNIDFlags	Current	The value of the RNID flag in hexadecimal format. It indicates if the node is valid, not valid, or not current.	OCTET STRING (SIZE (1))
LinkFormat	Current	The frame format.	INTEGER { ficon (1), common (2) }
RNIDType	Current	The value of the type number. Displays the type number of the self-describing node. It also describes the machine type.	OCTET STRING (SIZE (6))

7.2 FICON RNID Group

This group contains all Request Node Identification Data (RNID) group objects for FICON.

Table 9: FICON RNID Group

Object and OID	Access	Description
nodeRNIDTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.2.1	Read only	The number of entries in the Request Node Identification Data (RNID) table. For additional information on FICON MIB tables, refer to the `ficonShow` command in the *Brocade Fabric OS Command Reference Manual*.
nodeRNIDTable 1.3.6.1.4.1.1588.2.1.1.50.2.2	Not accessible	A table that contains one entry for each FICON RNID node attached to a switch.
nodeRNIDEntry 1.3.6.1.4.1.1588.2.1.1.50.2.2.1	Not accessible	An entry that contains the RNID information for a FICON node.
nodeRNIDIndex 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.1	Read only	The index into the nodeRNIDTable.
nodeRNIDIncidentPortWWN 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.2	Read only	The Port WWN for incident port. An N_Port (FICON device or host) is an incident port.
nodeRNIDPID 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.3	Read only	The PID for an incident port.
nodeRNIDFlags 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.4	Read only	The RNID flags for an incident port. Bits 0 to 2 of the flag describe the validity of bits 3 to 7 of the flag. Bit 3 of the flag specifies whether the node is a device-type node or a central-processor-complex-type (CPC-type) node. Bits 4 to 7 of the flag are reserved.
nodeRNIDType 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.5	Read only	The number associated with a node.
nodeRNIDModel 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.6	Read only	The model number of the RNID node.
nodeRNIDManufacturer 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.7	Read only	The manufacturer of the node.
nodeRNIDManufacturerPlant 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.8	Read only	The manufacturer plant of the node.
nodeRNIDSequenceNumber 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.9	Read only	The sequence number of the node.
nodeRNIDConnectedPortWWN 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.10	Read only	This object represents the WWN of the connected port.
nodeRNIDPortType 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.11	Read only	The port type (N, NL, E, or virtual port) of the connected port.
nodeRNIDFormat 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.12	Read only	The node identification data format of the connected port.

Table 9: FICON RNID Group

Object and OID	Access	Description
nodeRNIDTag 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.13	Read only	The node identification tag of the connected port.
nodeRNIDParams 1.3.6.1.4.1.1588.2.1.1.50.2.2.1.14	Read only	The node parameters of the connected port.
switchRNIDTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.2.3	Read only	The number of entries in an RNID table that correspond to the switch. For additional information on FICON MIB tables, refer to the `ficonShow` command in the *Brocade Fabric OS Command Reference Manual*.
switchRNIDTable 1.3.6.1.4.1.1588.2.1.1.50.2.4	Not accessible	A table that contains RNID information for each switch FICON node.
switchRNIDEntry 1.3.6.1.4.1.1588.2.1.1.50.2.4.1	Not accessible	An entry that contains the RNID information for the switch FICON node.
switchRNIDIndex 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.1	Read only	The index into switchRNIDTable.
switchRNIDSwitchWWN 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.2	Read only	The WWN of the switch.
switchRNIDFlags 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.3	Read only	The RNID flags for the switch.
switchRNIDType 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.4	Read only	The type number associated with the switch.
switchRNIDModel 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.5	Read only	The model number of the RNID switch.
switchRNIDManufacturer 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.6	Read only	The manufacturer of the switch.
switchRNIDManufacturerPlant 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.7	Read only	The manufacturer plant of the switch.
switchRNIDSequenceNumber 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.8	Read only	The sequence number of the switch.
switchRNIDTag 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.9	Read only	The identification tag of the switch.
switchRNIDParams 1.3.6.1.4.1.1588.2.1.1.50.2.4.1.10	Read only	The parameters of the switch.
nodeVfId 1.3.6.1.4.1.1588.2.1.1.50.2.5	Read only	The virtual fabric ID of the switch. For VF-unaware switches, this value will be 0.

7.3 FICON LIRR Group

This group contains all Link Incident Record Registration (LIRR) group objects for FICON.

Table 10: FICON LIRR Group

Object and OID	Access	Description
LIRRTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.3.1	Read only	The number of entries in an LIRR table. For additional information on FICON MIB tables, refer to the `ficonShow` command in the *Brocade Fabric OS Command Reference Manual*.
LIRRTable 1.3.6.1.4.1.1588.2.1.1.50.3.2	Not accessible	A table that contains LIRR information, one entry for each LIRR incident for an attached FICON device.
LIRREntry 1.3.6.1.4.1.1588.2.1.1.50.3.2.1	Not accessible	An entry containing LIRR information.
LIRRIndex 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.1	Read only	The index into the LIRR table.
LIRRListenerPortWWN 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.2	Read only	The WWN of the listener port.
LIRRListenerPID 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.3	Read only	The PID for the listener port.
LIRRRegType 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.4	Read only	The registration type: conditional or unconditional.
LIRRProtocol 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.5	Read only	The protocol type supported.
LIRRPortType 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.6	Read only	The attached port type.
LIRRFormat 1.3.6.1.4.1.1588.2.1.1.50.3.2.1.7	Read only	The LIRR format.

7.4 FICON RLIR Group

This group contains all Registered Link Incident Report (RLIR) group objects for FICON.

Table 11: FICON RLIR Group

Object and OID	Access	Description
rLIRTableNumEntries 1.3.6.1.4.1.1588.2.1.1.50.4.1	Read only	The number of entries in a switch RLIR table. For additional information on FICON MIB tables, refer to the `ficonShow` command in the *Brocade Fabric OS Command Reference Manual*.
rLIRTable 1.3.6.1.4.1.1588.2.1.1.50.4.2	Not accessible	A table that contains RLIR information, one entry for each RLIR incident for an attached FICON device.
rLIREntry 1.3.6.1.4.1.1588.2.1.1.50.4.2.1	Not accessible	An entry that contains RLIR information.
rLIRIndex 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.1	Read only	The index into the RLIR table.

Table 11: FICON RLIR Group

Object and OID	Access	Description
rLIRIncidentPortWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.2	Read only	The port WWN for the RLIR incident port.
rLIRIncidentNodeWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.3	Read only	The incident node WWN.
rLIRIncidentPortType 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.5	Read only	The RLIR incident port type.
rLIRIncidentPID 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.6	Read only	The RLIR incident PID.
rLIRIncidentPortNumber 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.7	Read only	The RLIR incident port number. This is a vendor-specific port number.
rLIRConnectedPortWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.8	Read only	The RLIR connected port WWN.
rLIRConnectedNodeWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.9	Read only	The RLIR connected node WWN.
rLIRFabricWwn 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.10	Read only	The RLIR fabric WWN.
rLIRLinkFailureType 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.11	Read only	The RLIR link failure type.
rLIRTimeStamp 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.12	Read only	The RLIR time stamp.
rLIRFormat 1.3.6.1.4.1.1588.2.1.1.50.4.2.1.13	Read only	The RLIR format.

7.5 LinkIncident MIB Traps Group

Table 12: LinkIncident MIB Traps Group

Trap Name and OID	Variables	Description
linkIncidentMIBTrapPrefix 1.3.6.1.4.1.1588.2.1.1.50.21.0	—	The link incident traps.
linkRNIDDeviceRegistration 1.3.6.1.4.1.1588.2.1.1.50.21.0.1	nodeRNIDIndex nodeRNIDIncidentPortWWN nodeRNIDConnectedPortWWN nodeVfId	A device registered with the switch.
linkRNIDDeviceDeRegistration 1.3.6.1.4.1.1588.2.1.1.50.21.0.2	nodeRNIDIndex nodeRNIDIncidentPortWWN nodeRNIDConnectedPortWWN nodeVfId	A device deregistered with the switch.

Table 12: LinkIncident MIB Traps Group

Trap Name and OID	Variables	Description
linkLIRRListenerAdded 1.3.6.1.4.1.1588.2.1.1.50.21.0.3	lIRRListenerPortWWN lIRRListenerPID lIRRIndex nodeVfId	A listener for a link failure incident was added.
linkLIRRListenerRemoved 1.3.6.1.4.1.1588.2.1.1.50.21.0.4	lIRRListenerPortWWN lIRRListenerPID lIRRIndex nodeVfId	A listener for a link failure incident was removed.
linkRLIRFailureIncident 1.3.6.1.4.1.1588.2.1.1.50.21.0.5	nodeRNIDIndex lIRRIndex rLIRIncidentPortWwn rLIRConnectedPortWwn rLIRIndex rLIRLinkFailureType lIRRListenerPID nodeVfId	A link failure incident has occurred. The value of lIRRIndex will be –2147483647 and lIRRListenerPID will be 0 if there is no listener for the incident.

Chapter 8: FibreAlliance MIB Objects

8.1 FibreAlliance MIB Overview

The descriptions of each of the MIB variables in this chapter come directly from the FCMGMT-MIB itself. The notes that follow the descriptions typically pertain to Brocade-specific information and are provided by Broadcom.

The object types in FCMGMT-MIB are organized into the following groups:

- Connectivity
- Statistic Set
- Service Set
- Trap Registration
- Revision Number

NOTE: The port swap feature does not have any effect on SNMP for the FA MIB.

8.1.1 FCMGMT-MIB System Organization of MIB Objects

The following depict the high-level organization of the FCMGMT-MIB.

FCMGMT-MIB High-Level Hierarchy

```
    - iso
       - org
          - dod
             - internet
                - experimental
                   - fcmgmt
                      - connSet
                         - uNumber 1.3.6.1.3.94.1.1
                         - systemURL 1.3.6.1.3.94.1.2
                         + connUnitTable 1.3.6.1.3.94.1.6
                         + connUnitRevsTable 1.3.6.1.3.94.1.7
                         + connUnitSensorTable 1.3.6.1.3.94.1.8
                         + connUnitPortTable 1.3.6.1.3.94.1.10
                         + connUnitEventTable 1.3.6.1.3.94.1.11
                         + connUnitLinkTable 1.3.6.1.3.94.1.12
                      - trapReg
                         - trapMaxClients 1.3.6.1.3.94.2.1
                         - trapClientCount 1.3.6.1.3.94.2.2
                         + trapRegTable 1.3.6.1.3.94.2.3
                   - revisionNumber 1.3.6.1.3.94.3
                   - statSet
                   + connUnitPortStatTable 1.3.6.1.3.94.4.5
                   - connUnitServiceSet
                         + connUnitServiceScalars 1.3.6.1.3.94.5.1
                         + connUnitServiceTables 1.3.6.1.3.94.5.2
```

ConnUnitTable Hierarchy

```
- connUnitTable 1.3.6.1.3.94.1.6
    - connUnitEntry 1.3.6.1.3.94.1.6.1
        - connUnitId 1.3.6.1.3.94.1.6.1.1
        - connUnitGlobalId 1.3.6.1.3.94.1.6.1.2
        - connUnitType 1.3.6.1.3.94.1.6.1.3
        - connUnitNumports 1.3.6.1.3.94.1.6.1.4
        - connUnitState 1.3.6.1.3.94.1.6.1.5
        - connUnitStatus 1.3.6.1.3.94.1.6.1.6
        - connUnitProduct 1.3.6.1.3.94.1.6.1.7
        - connUnitSn 1.3.6.1.3.94.1.6.1.8
        - connUnitUpTime 1.3.6.1.3.94.1.6.1.9
        - connUnitUrl 1.3.6.1.3.94.1.6.1.10
        - connUnitDomainId 1.3.6.1.3.94.1.6.1.11
        - connUnitProxyMaster 1.3.6.1.3.94.1.6.1.12
        - connUnitPrincipal 1.3.6.1.3.94.1.6.1.13
        - connUnitNumSensors 1.3.6.1.3.94.1.6.1.14
        - connUnitStatusChangeTime 1.3.6.1.3.94.1.6.1.15
        - connUnitConfigurationChangeTime 1.3.6.1.3.94.1.6.1.16
        - connUnitNumRevs 1.3.6.1.3.94.1.6.1.17
        - connUnitNumZones 1.3.6.1.3.94.1.6.1.18
        - connUnitModuleId 1.3.6.1.3.94.1.6.1.19
        - connUnitName 1.3.6.1.3.94.1.6.1.20
        - connUnitInfo 1.3.6.1.3.94.1.6.1.21
        - connUnitControl 1.3.6.1.3.94.1.6.1.22
        - connUnitContact 1.3.6.1.3.94.1.6.1.23
        - connUnitLocation 1.3.6.1.3.94.1.6.1.24
        - connUnitEventFilter 1.3.6.1.3.94.1.6.1.25
        - connUnitNumEvents 1.3.6.1.3.94.1.6.1.26
        - connUnitMaxEvents 1.3.6.1.3.94.1.6.1.27
        - connUnitEventCurrID 1.3.6.1.3.94.1.6.1.28
```

ConnUnitRevsTable Hierarchy

```
- connUnitRevsTable 1.3.6.1.3.94.1.7
    - connUnitRevsEntry 1.3.6.1.3.94.1.7.1
        - connUnitRevsUnitId 1.3.6.1.3.94.1.7.1.1
        - connUnitRevsIndex 1.3.6.1.3.94.1.7.1.2
        - connUnitRevsRevId 1.3.6.1.3.94.1.7.1.3
        - connUnitRevsDescription 1.3.6.1.3.94.1.7.1.4
```

ConnUnitSensorTable Hierarchy

```
- connUnitSensorTable 1.3.6.1.3.94.1.8
    - connUnitSensorEntry 1.3.6.1.3.94.1.8.1
        - connUnitSensorUnitId 1.3.6.1.3.94.1.8.1.1
        - connUnitSensorIndex 1.3.6.1.3.94.1.8.1.2
        - connUnitSensorName 1.3.6.1.3.94.1.8.1.3
        - connUnitSensorStatus 1.3.6.1.3.94.1.8.1.4
        - connUnitSensorInfo 1.3.6.1.3.94.1.8.1.5
        - connUnitSensorMessage 1.3.6.1.3.94.1.8.1.6
        - connUnitSensorType 1.3.6.1.3.94.1.8.1.7
        - connUnitSensorCharacteristic 1.3.6.1.3.94.1.8.1.8
```

ConnUnitPortTable Hierarchy

```
- connUnitPortTable 1.3.6.1.3.94.1.10
    - connUnitPortEntry 1.3.6.1.3.94.1.10.1
        - connUnitPortUnitId 1.3.6.1.3.94.1.10.1.1
        - connUnitPortIndex 1.3.6.1.3.94.1.10.1.2
        - connUnitPortType 1.3.6.1.3.94.1.10.1.3
        - connUnitPortFCClassCap 1.3.6.1.3.94.1.10.1.4
        - connUnitPortFCClassOp 1.3.6.1.3.94.1.10.1.5
        - connUnitPortState 1.3.6.1.3.94.1.10.1.6
        - connUnitPortStatus 1.3.6.1.3.94.1.10.1.7
        - connUnitPortTransmitterType 1.3.6.1.3.94.1.10.1.8
        - connUnitPortModuleType 1.3.6.1.3.94.1.10.1.9
        - connUnitPortWwn 1.3.6.1.3.94.1.10.1.10
        - connUnitPortFCId 1.3.6.1.3.94.1.10.1.11
        - connUnitPortSn 1.3.6.1.3.94.1.10.1.12
        - connUnitPortRevision 1.3.6.1.3.94.1.10.1.13
        - connUnitPortVendor 1.3.6.1.3.94.1.10.1.14
        - connUnitPortSpeed 1.3.6.1.3.94.1.10.1.15
        - connUnitPortControl 1.3.6.1.3.94.1.10.1.16
        - connUnitPortName 1.3.6.1.3.94.1.10.1.17
        - connUnitPortPhysicalNumber 1.3.6.1.3.94.1.10.1.18
        - connUnitPortStatObject 1.3.6.1.3.94.1.10.1.19
        - connUnitPortProtocolCap 1.3.6.1.3.94.1.10.1.20
        - connUnitPortProtocolOp 1.3.6.1.3.94.1.10.1.21
        - connUnitPortNodeWwn 1.3.6.1.3.94.1.10.1.22
        - connUnitPortHWState 1.3.6.1.3.94.1.10.1.23
```

ConnUnitEventTable Hierarchy

```
- connUnitEventTable 1.3.6.1.3.94.1.11
    - connUnitEventEntry 1.3.6.1.3.94.1.11.1
        - connUnitEventUnitId 1.3.6.1.3.94.1.11.1.1
        - connUnitEventIndex 1.3.6.1.3.94.1.11.1.2
        - connUnitEventId 1.3.6.1.3.94.1.11.1.3
        - connUnitREventTime 1.3.6.1.3.94.1.11.1.4
        - connUnitSEventTime 1.3.6.1.3.94.1.11.1.5
        - connUnitEventSeverity 1.3.6.1.3.94.1.11.1.6
        - connUnitEventType 1.3.6.1.3.94.1.11.1.7
        - connUnitEventObject 1.3.6.1.3.94.1.11.1.8
        - connUnitEventDescr 1.3.6.1.3.94.1.11.1.9
```

ConnUnitLinkTable Hierarchy

```
- connUnitLinkTable 1.3.6.1.3.94.1.12
    - connUnitLinkEntry 1.3.6.1.3.94.1.12.1
        - connUnitLinkUnitId 1.3.6.1.3.94.1.12.1.1
        - connUnitLinkIndex 1.3.6.1.3.94.1.12.1.2
        - connUnitLinkNodeIdX 1.3.6.1.3.94.1.12.1.3
        - connUnitLinkPortNumberX 1.3.6.1.3.94.1.12.1.4
        - connUnitLinkPortWwnX 1.3.6.1.3.94.1.12.1.5
        - connUnitLinkNodeIdY 1.3.6.1.3.94.1.12.1.6
        - connUnitLinkPortNumberY 1.3.6.1.3.94.1.12.1.7
        - connUnitLinkPortWwnY 1.3.6.1.3.94.1.12.1.8
        - connUnitLinkAgentAddressY 1.3.6.1.3.94.1.12.1.9
        - connUnitLinkAgentAddressTypeY 1.3.6.1.3.94.1.12.1.10
        - connUnitLinkAgentPortY 1.3.6.1.3.94.1.12.1.11
        - connUnitLinkUnitTypeY 1.3.6.1.3.94.1.12.1.12
        - connUnitLinkConnIdY 1.3.6.1.3.94.1.12.1.13
        - connUnitLinkCurrIndex 1.3.6.1.3.94.1.12.1.14
```

TrapRegTable Hierarchy

```
- trapRegTable 1.3.6.1.3.94.2.3
    - trapRegEntry 1.3.6.1.3.94.2.3.1
        - trapRegIpAddress 1.3.6.1.3.94.2.3.1.1
        - trapRegPort 1.3.6.1.3.94.2.3.1.2
        - trapRegFilter 1.3.6.1.3.94.2.3.1.3
        - trapRegRowState 1.3.6.1.3.94.2.3.1.4
```

ConnUnitPortStatTable Hierarchy

```
- connUnitPortStatTable 1.3.6.1.3.94.4.5
    - connUnitPortStatEntry 1.3.6.1.3.94.4.5.1
        - connUnitPortStatUnitId 1.3.6.1.3.94.4.5.1.1
        - connUnitPortStatIndex 1.3.6.1.3.94.4.5.1.2
        - connUnitPortStatCountError 1.3.6.1.3.94.4.5.1.3
        - connUnitPortStatCountTxObjects 1.3.6.1.3.94.4.5.1.4
        - connUnitPortStatCountRxObjects 1.3.6.1.3.94.4.5.1.5
        - connUnitPortStatCountTxElements 1.3.6.1.3.94.4.5.1.6
        - connUnitPortStatCountRxElements 1.3.6.1.3.94.4.5.1.7
        - connUnitPortStatCountBBCreditZero 1.3.6.1.3.94.4.5.1.8
        - connUnitPortStatCountInputBuffersFull 1.3.6.1.3.94.4.5.1.9
        - connUnitPortStatCountFBSYFrames 1.3.6.1.3.94.4.5.1.10
        - connUnitPortStatCountPBSYFrames 1.3.6.1.3.94.4.5.1.11
        - connUnitPortStatCountFRJTFrames 1.3.6.1.3.94.4.5.1.12
        - connUnitPortStatCountPRJTFrames 1.3.6.1.3.94.4.5.1.13
        - connUnitPortStatCountClass1RxFrames 1.3.6.1.3.94.4.5.1.14
        - connUnitPortStatCountClass1TxFrames 1.3.6.1.3.94.4.5.1.15
        - connUnitPortStatCountClass1FBSYFrames 1.3.6.1.3.94.4.5.1.16
        - connUnitPortStatCountClass1PBSYFrames 1.3.6.1.3.94.4.5.1.17
        - connUnitPortStatCountClass1FRJTFrames 1.3.6.1.3.94.4.5.1.18
        - connUnitPortStatCountClass1PRJTFrames 1.3.6.1.3.94.4.5.1.19
        - connUnitPortStatCountClass2RxFrames 1.3.6.1.3.94.4.5.1.20
        - connUnitPortStatCountClass2TxFrames 1.3.6.1.3.94.4.5.1.21
        - connUnitPortStatCountClass2FBSYFrames 1.3.6.1.3.94.4.5.1.22
        - connUnitPortStatCountClass2PBSYFrames 1.3.6.1.3.94.4.5.1.23
        - connUnitPortStatCountClass2FRJTFrames 1.3.6.1.3.94.4.5.1.24
        - connUnitPortStatCountClass2PRJTFrames 1.3.6.1.3.94.4.5.1.25
        - connUnitPortStatCountClass3RxFrames 1.3.6.1.3.94.4.5.1.26
        - connUnitPortStatCountClass3TxFrames 1.3.6.1.3.94.4.5.1.27
        - connUnitPortStatCountClass3Discards 1.3.6.1.3.94.4.5.1.28
        - connUnitPortStatCountRxMulticastObjects 1.3.6.1.3.94.4.5.1.29
        - connUnitPortStatCountTxMulticastObjects 1.3.6.1.3.94.4.5.1.30
        - connUnitPortStatCountRxBroadcastObjects 1.3.6.1.3.94.4.5.1.31
        - connUnitPortStatCountTxBroadcastObjects 1.3.6.1.3.94.4.5.1.32
        - connUnitPortStatCountRxLinkResets 1.3.6.1.3.94.4.5.1.33
        - connUnitPortStatCountTxLinkResets 1.3.6.1.3.94.4.5.1.34
        - connUnitPortStatCountNumberLinkResets 1.3.6.1.3.94.4.5.1.35
        - connUnitPortStatCountRxOfflineSequences 1.3.6.1.3.94.4.5.1.36
        - connUnitPortStatCountTxOfflineSequences 1.3.6.1.3.94.4.5.1.37
        - connUnitPortStatCountNumberOfflineSequences 1.3.6.1.3.94.4.5.1.38
        - connUnitPortStatCountLinkFailures 1.3.6.1.3.94.4.5.1.39
        - connUnitPortStatCountInvalidCRC 1.3.6.1.3.94.4.5.1.40
        - connUnitPortStatCountInvalidTxWords 1.3.6.1.3.94.4.5.1.41
        - connUnitPortStatCountPrimitiveSequenceProtocolErrors
1.3.6.1.3.94.4.5.1.42
        - connUnitPortStatCountLossofSignal 1.3.6.1.3.94.4.5.1.43
        - connUnitPortStatCountLossofSynchronization 1.3.6.1.3.94.4.5.1.44
        - connUnitPortStatCountInvalidOrderedSets 1.3.6.1.3.94.4.5.1.45
        - connUnitPortStatCountFramesTooLong 1.3.6.1.3.94.4.5.1.46
        - connUnitPortStatCountFramesTruncated 1.3.6.1.3.94.4.5.1.47
        - connUnitPortStatCountAddressErrors 1.3.6.1.3.94.4.5.1.48
        - connUnitPortStatCountDelimiterErrors 1.3.6.1.3.94.4.5.1.49
        - connUnitPortStatCountEncodingDisparityErrors 1.3.6.1.3.94.4.5.1.50
```

ConnUnitServiceScalars Hierarchy

```
- connUnitServiceSet
   - connUnitServiceScalars
      - connUnitSnsMaxEntry 1.3.6.1.3.94.5.1.1
```

ConnUnitSnsTable Hierarchy

```
- connUnitServiceSet
   - connUnitServiceTables
      - connUnitSnsTable 1.3.6.1.3.94.5.2.1
         - connUnitSnsEntry 1.3.6.1.3.94.5.2.1.1
            - connUnitSnsId 1.3.6.1.3.94.5.2.1.1.1
            - connUnitSnsPortIndex 1.3.6.1.3.94.5.2.1.1.2
            - connUnitSnsPortIdentifier 1.3.6.1.3.94.5.2.1.1.3
            - connUnitSnsPortName 1.3.6.1.3.94.5.2.1.1.4
            - connUnitSnsNodeName 1.3.6.1.3.94.5.2.1.1.5
            - connUnitSnsClassOfSvc 1.3.6.1.3.94.5.2.1.1.6
            - connUnitSnsNodeIPAddress 1.3.6.1.3.94.5.2.1.1.7
            - connUnitSnsProcAssoc 1.3.6.1.3.94.5.2.1.1.8
            - connUnitSnsFC4Type 1.3.6.1.3.94.5.2.1.1.9
            - connUnitSnsPortType 1.3.6.1.3.94.5.2.1.1.10
            - connUnitSnsPortIPAddress 1.3.6.1.3.94.5.2.1.1.11
            - connUnitSnsFabricPortName 1.3.6.1.3.94.5.2.1.1.12
            - connUnitSnsHardAddress 1.3.6.1.3.94.5.2.1.1.13
            - connUnitSnsSymbolicPortName 1.3.6.1.3.94.5.2.1.1.14
            - connUnitSnsSymbolicNodeName 1.3.6.1.3.94.5.2.1.1.15
```

8.1.2 Definitions for FCMGMT-MIB

Table 13 lists the definitions used for FCMGMT-MIB.

Table 13: Definitions for FCMGMT-MIB

Type Definition	Value	Description
FcNameId	Octet string of size 8	The port name for this entry in the SNS table.
FcGlobalId	Octet string of size 16	An optional global-scope identifier for this connectivity unit. It *must* be a WWN for this connectivity unit or 16 octets of value zero.
FcAddressId	Octet string of size 3	The Port Identifier for this entry in the SNS table.

Table 13: Definitions for FCMGMT-MIB (Continued)

Type Definition	Value	Description
FcEventSeverity	Integer	1 (unknown) 2 (emergency) Emergency status. 3 (alert) Alert status. 4 (critical) Critical status. 5 (error) Error status. 6 (warning) Warning status. 7 (notify) Notification status. 8 (info) Informational status. 9 (debug) Debug status. 10 (mark) All messages logged.
FcUnitType	Integer	1 (unknown) 2 (other) None of 3–14. 3 (hub) Passive connectivity unit supporting loop protocol. 4 (switch) Active connectivity unit supporting multiple protocols. 5 (gateway) Unit that not only converts the interface but also encapsulates the frame into another protocol. The assumption is that there are always two gateways connected together: for example, FC <-> ATM. 6 (converter) Unit that converts from one interface to another: for example, FC <-> SCSI. 7 (hba) Host bus adapter. 8 (proxy-agent) Software proxy agent. 9 (storage-device) Disk, CD, tape, and so on. 10 (host) Host computer. 11 (storage-subsystem) For example, RAID, library. 12 (module) Subcomponent of a system. 13 (swdriver) Software driver. 14 (storage-access-device) Provides storage management and access for heterogeneous hosts and heterogeneous devices.

8.2 Connectivity Unit Group

Implementation of the connectivity group is mandatory for all systems.

Object and OID	Access	Description
uNumber 1.3.6.1.3.94.1.1	Read only	The number of connectivity units present on this system (represented by this agent). Might be a count of the boards in a chassis or the number of full boxes in a rack. The connectivity unit is mapped to a switch. uNumber is always set to one.
systemURL 1.3.6.1.3.94.1.2	Read only	The top-level URL of the system; if it does not exist, the value is an empty string. The URL format is implementation dependant and can have keywords embedded that are preceded by a percent sign (for example, %USER).The following are the defined keywords that are recognized and replaced with data during a launch. ■ USER Replace with username ■ PASSWORD Replace with password ■ GLOBALID Replace with global ID ■ SERIALNO Replace with serial number The expected value for system URL.0 is: `http://{a.b.c.d}` where {a.b.c.d} is the IP address of the switch if a Web Tools license is available. `""`(null) where " " is used when a Web Tools license is not available.
connUnitTable 1.3.6.1.3.94.1.6	Not accessible	A list of units under a single SNMP agent. The number of entries is given by the value of uNumber. The value is 1 for a stand-alone system.
connUnitEntry 1.3.6.1.3.94.1.6.1	Not accessible	A connectivity unit entry that contains objects for a particular unit.
connUnitId 1.3.6.1.3.94.1.6.1.1	Read only	This object indicates the WWN of the switch. The Brocade implementation maps the switch WWN to the first 8 octets of this object and sets the remaining 8 octets to 0.

Object and OID	Access	Description

connUnitGlobalId
1.3.6.1.3.94.1.6.1.2
	Read only	An optional global-scope identifier for this connectivity unit. It must be a WWN for this connectivity unit or 16 octets of value 0.
		
		The following characteristics are required.
		■ WWN formats requiring fewer than 16 octets must be extended to
		16 octets with trailing 0 octets.
		■ If a WWN is used for connUnitId, the same WWN must be used for connUnitGlobalId.
		
		When a non-zero value is provided, the following characteristics are strongly recommended.
		■ Should be persistent across agent and unit resets.
		■ Should be globally unique.
		■ Should be one of these FC-PH/PH3 formats:
		  – IEEE (NAA=1)
		  – IEEE Extended (NAA=2)
		  – IEEE Registered (NAA=5)
		  – IEEE Registered extended (NAA=6)
		
		Use of the IEEE formats allows any IEEE-registered vendor to assure global uniqueness independently. The following are some references on IEEE WWN formats:
		
		`http://standards.ieee.org/regauth/oui/tutorials/fibreformat.html`
		
		`http://standards.ieee.org/regauth/oui/tutorials/fibrecomp_id.html`
		
		If one or more WWNs are associated with the connUnit through other management methods, one of them should be used for connUnitGlobalId.
		
		If a WWN is not specifically assigned to the connUnit, there is some merit to using a WWN assigned to (one of) its permanently attached FC/LAN interfaces. This cannot risk uniqueness, though.
		
		As a counterexample, if your agent runs in a host and the host has an HBA, it is quite possible that agent, host, and HBA are all distinct connUnits, so the host and agent cannot use the WWN of the HBA.
		
		If your hub has a built-in Ethernet port, it might be reasonable for the hub to use its LAN address (prefixed with the appropriate NAA) as its connUnitId. But if the Ethernet is a replaceable PCCard, the hub should have an independent ID.
		
		The Brocade implementation maps the switch WWN to the top 8 octets of this variable and sets the remaining lower 8 octets to 0.
		
		For example:
		
		If Brocade's switch WWN is 10:0:0:60:69:10:02:18, then use the SNMP GET command on connUnitGlobalId.10.0.0.60.69.10.02.18.0.0.0.0.0.0.0.0 returns:
		
		10 00 00 60 69 10 02 18 00 00 00 00 00 00 00 00

connUnitType 1.3.6.1.3.94.1.6.1.3	Read only	The type of this connectivity unit. Set to 4 for Fibre Channel switches or to 14 for Brocade Access Gateway.

Object and OID	Access	Description
connUnitNumports 1.3.6.1.3.94.1.6.1.4	Read only	The number of physical ports (between 0 and the maximum number of system supported ports) in the connectivity unit (external). The Brocade switches support 0 to the maximum number of system supported ports. **NOTE:** The ConnUnitNumports will not count the GE ports present on the FC4-16IP blade. The maximum number of supported ports are as follows. Brocade 6505 — 24 ports Brocade 6510 — 48 ports Brocade 6520 — 96 ports Brocade G620 — 64 ports Brocade 7800 Extension Switch — 24 ports Brocade Encryption Switch — 32 ports Brocade DCX — 640 ports Brocade DCX-4S — 320 ports Brocade DCX 8510-4 Backbone — 320 ports Brocade DCX 8510-8 Backbone — 640 ports Brocade X6-4 — 320 ports Brocade X6-8 — 512 ports
connUnitState 1.3.6.1.3.94.1.6.1.5	Read only	The overall state of the connectivity unit. Possible values are: ■ unknown (1) ■ online (2) - Sets the state to online. ■ offline (3) - Sets the state to offline. Mapped as follows: switchState (ONLINE) 2 (online) switchState (not ONLINE) 3 (offline, testing, faulty)
connUnitStatus 1.3.6.1.3.94.1.6.1.6	Read only	The overall status of the connectivity unit. This switch status is based on the most severe status of contributors like Power Supplies, Temperatures, Fans, WWN Servers, Standby CP, Blades, Flash, Marginal Ports, Faulty Ports, Missing SFPs, and so on. The `switchStatusPolicyShow` command displays the policy parameters that determines the overall switch status. Possible values are: ■ unknown (1) - Unknown ■ unused (2) - Unmonitored ■ ok (3) - Healthy/Okay ■ warning (4) - Marginal/Warning ■ failed (5) - Down/Failed
connUnitProduct 1.3.6.1.3.94.1.6.1.7	Read only	The connectivity unit vendor's product model name. This is the same as for sysDescr (set for as many as 79 bytes). If the switch is in Access Gateway mode, the default value is Access Gateway.
connUnitSn 1.3.6.1.3.94.1.6.1.8	Read only	The serial number for this connectivity unit. Set to the SSN (which by default is the WWN).

Object and OID	Access	Description
connUnitUpTime 1.3.6.1.3.94.1.6.1.9	Read only	The number of centiseconds since the last unit initialization.

connUnitUrl
1.3.6.1.3.94.1.6.1.10
	Read only	The URL to launch a management application, if applicable; otherwise an empty string. In a stand-alone unit, this would be the same as the top-level URL. This has the same definition as systemURL for keywords.
		(Same as systemURL.) The expected value for connUnitURL.0 is:
		`"http://{a.b.c.d}"`
		where {a.b.c.d} is the IP address of the switch if a Web Tools license is available.
		`"" (null)`
		where "" is the IP address of the switch if a Web Tools license is not available.

connUnitDomainId 1.3.6.1.3.94.1.6.1.11	Read only	The 24-bit Fibre Channel address ID of this connectivity unit, right-justified with leading 0s if required. If this value is not applicable, return all bits to one. Set to the switch domain ID (as per FC-SW). For a Brocade Access Gateway device, the value is hard coded as "11 11 11". A Brocade Access Gateway does not have a domain ID.
connUnitProxyMaster 1.3.6.1.3.94.1.6.1.12	Read only	A value of "yes" means this is the proxy master unit for a set of managed units. Possible values are: ■ unknown (1) ■ no (2) ■ yes (3) This could be the only unit with a management card in it for a set of units. A stand-alone unit should return "yes" for this object. Set to 3 (yes).
connUnitPrincipal 1.3.6.1.3.94.1.6.1.13	Read only	Indicates whether this connectivity unit is the principal unit within the group of fabric elements. If this value is not applicable, it returns "unknown". If the switch is principal, this is set to 3 (yes); otherwise, for a fabric switch it is set to 2 (no). For a Brocade Access Gateway device, since the switch is behaves as a device management tool and not a Fibre Channel switch, the value is set to 1 (unknown). Possible values are: ■ unknown (1) ■ no (2) ■ yes (3)
connUnitNumSensors 1.3.6.1.3.94.1.6.1.14	Read only	Number of sensors (between 0 and the maximum number of sensors) in the connUnitSensorTable. For specific sensor counts on the various switches, see Table 5 on page 60.

Object and OID	Access	Description
connUnitStatusChangeTime 1.3.6.1.3.94.1.6.1.15	Read only	The sysuptime timestamp (in centiseconds) at when the last status change occurred for any members of the set; this is the latest timestamp when connUnitStatus or connUnitPortStatus changed. **NOTE:** This object is not supported.
connUnitConfigurationChangeTime 1.3.6.1.3.94.1.6.1.16	Read only	The sysuptime timestamp (in centiseconds) when the last configuration change occurred for any members of the set. In other words, this is the latest timestamp of flash memory update. This represents a union of change information for connUnitConfigurationChangeTime. **NOTE:** This object is not supported.
connUnitNumRevs 1.3.6.1.3.94.1.6.1.17	Read only	The number of revisions in connUnitRevsTable. Set to 2.
connUnitNumZones 1.3.6.1.3.94.1.6.1.18	Read only	The number of zones defined in connUnitZoneTable. **NOTE:** This object is not supported.
connUnitModuleId 1.3.6.1.3.94.1.6.1.19	Read only	This is a unique ID, persistent between boots, that can be used to group a set of connUnits together into a module. The intended use would be to create a connUnit with a connUnitType of "module" to represent a physical or logical group of connectivity units. Then the value of the group would be set to the value of connUnitId for this "container" connUnit. connUnitModuleId should be 0s if this connUnit is not part of a module. Set to the WWN of the switch.
connUnitName 1.3.6.1.3.94.1.6.1.20	Read-write	A display string that contains a name for this connectivity unit. This object value should be persistent between boots. Set to switchName/sysName.
connUnitInfo 1.3.6.1.3.94.1.6.1.21	Read-write	A display string that contains information about this connectivity unit. This object value should be persistent between boots. For a fabric switch set to sysDescr and read only. For a Brocade Access Gateway device set to "Access Gateway."

Object and OID	Access	Description
connUnitControl 1.3.6.1.3.94.1.6.1.22	Read-write	Controls the addressed connUnit. Each implementation might choose not to allow any or all of these values on a SET. Cold start and warm start are as defined in MIB-II and are not meant to be a factory reset. This is similar to swAdmStatus: ■ resetConnunitColdStart = reboot ■ resetConnunitWarmStart = fastboot ■ offlineConnUnit = disable switch ■ onlineConnUnit = enable switch ■ default after reboot = unknown The declaration 1 (unknown) maps to the default value upon rebooting, and 2 (invalid) is not applicable. Declarations 3 and 4 perform the same operation: a cold boot of the switch. Possible values are: ■ unknown (1) ■ invalid (2) ■ resetConnUnitColdStart (3): Reboot. The addressed unit performs a switch reboot. ■ resetConnUnitWarmStart (4): Fastboot. The addressed unit performs a warm start reset. ■ offlineConnUnit (5): Disable switch. The addressed unit puts itself into an implementation-dependant offline state. In general, if a unit is in an offline state, it cannot be perform meaningful Fibre Channel work. ■ onlineConnUnit (6): Enable switch. The addressed unit puts itself into an implementation-dependant online state. In general, if a unit is in an online state, it can perform meaningful Fibre Channel work.
connUnitContact 1.3.6.1.3.94.1.6.1.23	Read-write	Contact information for this connectivity unit. Displays the same value as sysContact. Changing the value in this variable causes the value in sysContact to also be changed.
connUnitLocation 1.3.6.1.3.94.1.6.1.24	Read-write	Location information for this connectivity unit. Displays the same value as sysLocation.
connUnitEventFilter 1.3.6.1.3.94.1.6.1.25	Read only	Defines the event severity logged by this connectivity unit. All events of a severity less than or equal to connUnitEventFilter are logged in connUnitEventTable. Always returns value 9 (debug).
connUnitNumEvents 1.3.6.1.3.94.1.6.1.26	Read only	The number of events currently in connUnitEventTable. Fabric OS currently supports 1024 raslog events.
connUnitMaxEvents 1.3.6.1.3.94.1.6.1.27	Read only	The maximum number of events that can be defined in connUnitEventTable. This value ranges from 0 to 1024.
connUnitEventCurrID 1.3.6.1.3.94.1.6.1.28	Read only	The last used event ID (connUnitEventId). Every RASLOG message has a RASLOG number, and this represents the RASLOG number. The maximum is 2147483647 (2^{31}–1). **NOTE:** connUnitEventId is obsolete.

Object and OID	Access	Description
connUnitRevsTable 1.3.6.1.3.94.1.7	Not accessible	The table of the revisions supported by connectivity units managed by this agent. Usage Notes: This table lists the versions of hardware and software elements in the switch. One entry for the hardware platform version and another entry for the Fabric OS version. For example, for the Brocade 4100, the hardware platform number is 32.0. The Fabric OS version for this release is 5.1.
connUnitRevsEntry 1.3.6.1.3.94.1.7.1	Not accessible	Each entry contains the information for a specific revision.
connUnitRevsUnitId 1.3.6.1.3.94.1.7.1.1	Read only	The connUnitId value for the connectivity unit that contains this revision table.
connUnitRevsIndex 1.3.6.1.3.94.1.7.1.2	Read only	A unique value among all connUnitRevsEntrys with the same value of connUnitRevsUnitId, in the range between 1 and connUnitNumRevs. Index 1 returns the hardware version. Index 2 returns the software version.
connUnitRevsRevId 1.3.6.1.3.94.1.7.1.3	Read only	A vendor-specific string identifying a revision of a component of the connUnit indexed by connUnitRevsUnitId. Index 1 returns the switchType from `switchShow`. Index 2 returns the Fabric OS version using the Telnet command **version**: for example, v8.0.1.
connUnitRevsDescription 1.3.6.1.3.94.1.7.1.4	Read only	A description of a component to which the revision corresponds. Index 1 returns the hardware version. Index 2 returns the software version.
connUnitSensorTable 1.3.6.1.3.94.1.8	Not accessible	A table of the sensors supported by each connectivity unit managed by this agent. For specific sensor counts on the various switches, see Table 5 on page 60.
connUnitSensorEntry 1.3.6.1.3.94.1.8.1	Not accessible	Each entry contains the information for a specific sensor.
connUnitSensorUnitId 1.3.6.1.3.94.1.8.1.1	Read only	The connUnitId value of the connectivity unit that contains this sensor table. Set to connUnitId.
connUnitSensorIndex 1.3.6.1.3.94.1.8.1.2	Read only	A unique value among all connUnitSensorEntrys with the same value of connUnitSensorUnitId, in the range between 1 and the return value from connUnitNumSensor.
connUnitSensorName 1.3.6.1.3.94.1.8.1.3	Read only	A textual identification of the sensor, intended primarily for operator use. Each contains the name of sensor in textual format: for example, Temp #1, Fan #2, and so on.

Object and OID	Access	Description
connUnitSensorStatus 1.3.6.1.3.94.1.8.1.4	Read only	The status indicated by the sensor. Possible values are: ■ unknown (1) ■ other (2) ■ ok (3) The sensor indicates okay. ■ Warning (4) - The sensor indicates a warning. ■ failed (5) - The sensor indicates a failure. ■ Nominal = 3 (ok).
connUnitSensorInfo 1.3.6.1.3.94.1.8.1.5	Read only	Miscellaneous static information about the sensor, such as its serial number. Each contains textual information about the sensor. Returns the serial ID if this is for the power supply; otherwise, returns Null.
connUnitSensorMessage 1.3.6.1.3.94.1.8.1.6	Read only	This describes the status of the sensor as a message. It may also provide some information about the sensor, for example: `sensor 1: type 3 is OK, value is 33` Each contains the sensor status (and reading if applicable) in textual format.
connUnitSensorType 1.3.6.1.3.94.1.8.1.7	Read only	The type of component being monitored by this sensor. Possible values are: ■ unknown (1) ■ other (2) ■ battery (3) ■ fan (4) ■ power-supply (5) ■ transmitter (6) ■ enclosure (7) ■ board (8) ■ receiver (9) The following mapping is for each individual sensor, where applicable: swSensorType 1 (temperature) 2 (fan) 3 (power supply) connUnitSensorType 8 (board) 4 (fan) 5 (power supply)

Object and OID	Access	Description
connUnitSensorCharacteristic 1.3.6.1.3.94.1.8.1.8	Read only	The characteristics being monitored by this sensor. The following mapping is for each individual sensor, where applicable: swSensorType 1 (temperature) 2 (fan)| 3 (power supply) connUnitSensorCharacteristic 3 (temperature) 7 (airflow) 9 (power) Possible values are: ■ unknown (1) ■ other (2) ■ temperature (3) ■ pressure (4) ■ emf (5) ■ currentValue (6) Current is a keyword. ■ airflow (7) ■ frequency (8) ■ power (9) ■ door (10) - Not supported in Fabric OS 2.6.1.
connUnitPortTable 1.3.6.1.3.94.1.10	Not accessible	Generic information on ports for a specific connUnit. **NOTE:** This table is specific to an FC port, so the object instance of its corresponding Ethernet and FCoE port's object values will not display when you issue `SNMP GET` or `SNMP WALK` command.
connUnitPortEntry 1.3.6.1.3.94.1.10.1	Not accessible	Each entry contains the information for a specific port,
connUnitPortUnitId 1.3.6.1.3.94.1.10.1.1	Read only	The connUnitId value of the connectivity unit that contains this port. Same value as connUnitId.

Object and OID	Access	Description
connUnitPortIndex 1.3.6.1.3.94.1.10.1.2	Read only	The number of physical ports between 0 and the maximum number of system-supported ports in the connectivity unit (internal/embedded, external). To determine the maximum number of system- supported ports, use the SNMP GET command on swFcPortCapacity. The Brocade switches support 0 to the maximum number of system supported ports. The maximum number of supported physical ports are as follows: Brocade 6505 — 24 ports Brocade 6510 — 48 ports Brocade 6520 — 96 ports Brocade 7800 Extension Switch — 24 ports Brocade DCX — 640 ports Brocade DCX-4S — 320 ports Brocade DCX 8510-4 Backbone — 320 ports Brocade DCX 8510-8 Backbone — 640 ports Brocade Encryption Switch — 32 ports Brocade G620 — 64 ports Brocade VA-40FC — 40 ports Brocade X6-4 — 320 ports Brocade X6-8 — 512 ports
connUnitPortType 1.3.6.1.3.94.1.10.1.3	Read only	The port type. For an EX_Port, VEX_Port, and VE_Port, the port type will be shown as other. For a Brocade Access Gateway device, the port type can be either F_Port (f-port) or N_Port (n-port) only. Possible values are: ■ unknown (1) ■ other (2) ■ not-present (3) ■ hub-port (4) ■ n-port (5) End port for fabric. ■ l-port (6) End port for loop. ■ fl-port (7) Public loop. ■ f-port (8) Fabric port. ■ e-port (9) Fabric expansion port. ■ g-port (10) Generic fabric port. ■ domain-ctl (11) Domain controller. ■ hub-controller (12) ■ scsi (13) Parallel SCSI port. ■ escon (14) ■ lan (15) ■ wan (16) ■ ac (17) AC power line ■ dc (18) DC power line ■ ssa (19) Serial storage architecture

Object and OID	Access	Description
connUnitPortFCClassCap 1.3.6.1.3.94.1.10.1.4	Read only	A bit mask that specifies the classes of service capability of this port. If this is not applicable, returns all bits set to 0. The bits have the following definition: ■ unknown 0 ■ class-f 1 ■ class-one 2 ■ class-two 4 ■ class-three 8 ■ class-four 16 ■ class-five 32 ■ class-six 64 For an F_Port, FL_Port, or SIM_Port, this value is 0x000C. For a G_Port or E_Port, this value is 0x000D. For a Brocade Access Gateway, for both the F_Port, and N_Port this value is 0x0008. An Access Gateway supports class-three services only; therefore the value is 8 for both port types. The connUnitPortFCClassCap attribute is dependent on the state of the port, that is, whether the port is online or offline. If the port is offline, the class service of U port will be shown as the value of connUnitPortFCClassCap. If the port is online, then this MIB attribute value will be equal to the class service corresponding to the port type (F, E, L port).
connUnitPortFCClassOp 1.3.6.1.3.94.1.10.1.5	Read only	A bit mask that specifies the classes of service that are currently operational. If this is not applicable, returns all bits set to 0. This object has the same definition as connUnitPortFCClassCap. For an F_Port, FL_Port, or SIM_Port, this value is 0x000C. For a G_Port or E_Port, this value is 0x000D. For a Brocade Access Gateway, for both the F_Port and N_Port, this value is 0x0008. A Brocade Access Gateway supports class-three services only; therefore the value is 8 for both port types. connUnitPortFCClassOp is independent of the state of the port (online or offline). Its value is dependent only on the port type.
connUnitPortState 1.3.6.1.3.94.1.10.1.6	Read only	The state of the port hardware. Possible values are: ■ unavailable (1) - Do not use. ■ online (2) - Available for meaningful work. ■ offline (3) - Not available for meaningful work. ■ bypassed (4) - No longer used. ■ diagnostics (5) - Map to your testing. (Not supported in Fabric OS 2.6.1.) For an E, F, or FL_Port, the value is online. For a U_Port, the value is offline (disabled, testing, faulted).

Object and OID	Access	Description
connUnitPortStatus 1.3.6.1.3.94.1.10.1.7	Read only	The overall protocol status for the port. For a U_Port, the status should be ols (9). Possible values are: - unknown (1) - unused (2) - The device cannot report this status. - ready (3) - FCAL Loop or FCPH Link reset protocol initialization has completed. - warning (4) - Do not use. - failure (5) - The port is faulty. - notparticipating (6) - The loop not participating and does not have a loop address. Do not use. - initializing (7) - The protocol is proceeding. Do not use. - bypass (8) - Do not use. - ols (9) - FCP offline status. (Not supported in Fabric OS 2.6.1.) **NOTE:** For an E_Port, F_Port, or FL_Port, the value is 3 (ready). For a U_Port, the value is 2 (unused) if not faulty with a GBIC, 1 (unknown) if not faulty with no GBIC, or 5 (failure) if faulty. In Fabric OS 3.x and later, for an E_Port, F_Port, FL_Port, or other port and online port state, the value is 3 (ready). For a G_Port or other port and offline port state, the value is 9 (ols). For an unknown port type and offline port state, the value is 1 (unknown).
connUnitPortTransmitterType 1.3.6.1.3.94.1.10.1.8	Read only	The technology of the port transceiver. Possible values are: - unknown (1) - other (2) - unused (3) - shortwave (4) - longwave (5) - copper (6) - scsi (7) - longwaveNoOFC (8) - shortwaveNoOFC (9) - longwaveLED (10) - ssa (11) (Not supported in Fabric OS 2.6.1.) For an external FC port, this value should be 9 (shortwaveNoOFC), 8 (longwaveNoOFC), or 6 (copper).

Object and OID	Access	Description
connUnitPortModuleType 1.3.6.1.3.94.1.10.1.9	Read only	The module type of the port connector. Possible values are: ■ unknown (1) ■ other (2) ■ gbic (3) ■ embedded (4) Fixed (oneXnine) ■ glm (5) ■ gbicSerialId (6) ■ gbicNoSerialId (7) ■ gbicNotInstalled (8) ■ smallFormFactor (9) For an external FC port with a GBIC, this value is set to 6 (gbicSerialId) or 7 (gbicNoSerialId). For an external FC port without a GBIC, this value is set to 8 (gbicNotInstalled).
connUnitPortWwn 1.3.6.1.3.94.1.10.1.10	Read only	The World Wide Name of the port, if applicable; otherwise, an empty string. This is in IEEE Extended format, and the extension contains the internal port number of each port. **NOTE:** The internal port number is 1 less than the port index. For example, if the switch has WWN 10:00:00:60:69:10:02:18, then port numbers 0 and 6 have WWN 20:00:00:60:69:10:02:18 and 20:06:00:60:69:10:02:18. However, the embedded port has WWN 10:00:00:60:69:10:02:18, the same as the switch.
connUnitPortFCId 1.3.6.1.3.94.1.10.1.11	Read only	This is the assigned Fibre Channel ID of the port. If the port does not have a Fibre Channel address, this object returns all bits set to 1. For an F_Port, this is the Fibre Channel ID to which the connected N_Port is assigned. For an FL_Port, this is the Fibre Channel ID of the FL_Port. For a U or E_Port, this is similar to an F_Port. The FC ID is formatted "DD AA PP" (for example, "02 00 02"). The Brocade Access Gateway port FC ID differs from a Fibre Channel switch. A Fibre Channel switch port FC ID has the same DD with a different AA value for each link. The Brocade Access Gateway "PP" is the port number for F_Ports and is always zero for N_Ports. Therefore the N_Port FC ID always appears as "DD AA 00" (for example, "02 00 00"). On a Brocade Access Gateway, the FC ID of different ports can have the same "AA" value but different "DD" values and vice versa.
connUnitPortSn 1.3.6.1.3.94.1.10.1.12	Read only	The serial number of the unit (for example, for a GBIC). If this is not applicable, returns an empty string. If the GBIC has a serial ID, the return value is the GBIC part number; otherwise, the return value is Null.
connUnitPortRevision 1.3.6.1.3.94.1.10.1.13	Read only	The port revision (for example, GBIC). If the GBIC has a serial ID, this returns the GBIC revision number; otherwise, it returns a Null value.
connUnitPortVendor 1.3.6.1.3.94.1.10.1.14	Read only	The port vendor (for example, for a GBIC). If the GBIC has a serial ID, this returns the GBIC vendor name; otherwise, it returns a Null value.

Object and OID	Access	Description
connUnitPortSpeed 1.3.6.1.3.94.1.10.1.15	Read only	The speed of the port, in kilobytes per second. For example, the valid values for Brocade 12000, 24000, and 48000 directors: 250,000KB/s, 500,000KB/s, 1,000,000KB/s, 1,250,000 KB/s, 2,000,000KB/s, 4,000,000KB/s, 16,000,000KB/s, and 32,000,000KB/s depending on the configuration.

Object and OID	Access	Description
connUnitPortControl 1.3.6.1.3.94.1.10.1.16	Read-write	Controls the addressed connUnit's port. Valid commands are: **resetConnUnitPort** If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific reset operation. Examples of this operation are: ■ The Link Reset protocol. ■ The Loop Initialization protocol. ■ Resynchronization occurring between the transceiver in the addressed port to the transceiver to which the port is connected. **bypassConnUnitPort** If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific "bypass" operation. Examples of this operation are: ■ Transitioning from online to offline. ■ A request (NON-PARTICIPATING) command to the loop port state machine. ■ Removal of the port from an arbitrated loop by a hub. **unbypassConnUnitPort** If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific "unbypass" operation. Examples of this operation are: ■ The Link Failure protocol. ■ A request (PARTICIPATING) command to the loop port state machine. ■ Addition of the port to an arbitrated loop by a hub. **offlineConnUnitPort** If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific offline operation. Examples of these operations are: ■ Disabling a port's transceiver. ■ The Link Failure protocol. ■ A request (NON-PARTICIPATING) command to the loop port state machine ■ Removal of the port from an arbitrated loop by a hub. **onlineConnUnitPort** If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific online operation. Examples of this operation are: ■ Enabling a port's transceiver. ■ The Link Failure protocol, ■ A request (PARTICIPATING) command to the loop port state machine. ■ Addition of the port from an arbitrated loop by a hub.

Object and OID	Access	Description

connUnitPortControl
1.3.6.1.3.94.1.10.1.16
(continued)
	Read-write	Each implementation might choose not to allow any or all of these values on a SET.
		If the management station uses in-band communication (FC-IP) with the switch, either of the following two actions might result in a loss of in-band communication with the switch.
		   – Disabling the FC port that is connected to the management station.
		   – Disabling the embedded port.
		
		Return values are:
		■ resetConnUnitPort portDisable (F or E_Port, loop for U_Port)
		■ bypassConnUnitPort portDisable (FL_Port)
		■ unbypassConnUnitPort portEnable (FL_Port)
		■ offlineConnUnitPort portDisable (E, F, FL_Port)
		■ onlineConnUnitPort portEnable (U)
		■ resetConnUnitPortCounters clear the port statistics counter. When rebooted, this defaults to 1 (unknown).

connUnitPortName 1.3.6.1.3.94.1.10.1.17	Read-write	A string that describes the addressed port. **NOTE:** This object is read only for Brocade switches.
connUnitPortPhysicalNumber 1.3.6.1.3.94.1.10.1.18	Read only	This is the internal port number by which this port is known. In many implementations, this should be the same as connUnitPortIndex. Some implementations might have an internal port representation that is not compatible with the rules for table indices. In these cases, provide the internal representation of this port in this object. This value might also be used in the connUnitLinkPortNumberX or connUnitLinkPortNumberY objects of the connUnitLinkTable. The internal port numbers for Brocade switch. Brocade switches support 0 through the maximum number of ports. The maximum number of supported ports are as follows. <table><tr><td>Brocade 300</td><td>24 ports</td></tr><tr><td>Brocade 5100</td><td>40 ports</td></tr><tr><td>Brocade 5300</td><td>80 ports</td></tr><tr><td>Brocade 6505</td><td>24 ports</td></tr><tr><td>Brocade 6510</td><td>48 ports</td></tr><tr><td>Brocade 6520</td><td>96 ports</td></tr><tr><td>Brocade 7800 Extension Switch</td><td>24 ports</td></tr><tr><td>Brocade Encryption Switch</td><td>32 ports</td></tr><tr><td>Brocade DCX</td><td>640 ports</td></tr><tr><td>Brocade DCX-4S</td><td>320 ports</td></tr><tr><td>Brocade DCX 8510-4 Backbone</td><td>320 ports</td></tr><tr><td>Brocade DCX 8510-8 Backbone</td><td>640 ports</td></tr><tr><td>Brocade VA-40FC</td><td>40 ports</td></tr></table>

Object and OID	Access	Description
connUnitPortStatObject 1.3.6.1.3.94.1.10.1.19	Read only	This OID is deprecated. This contains the OID of the first object of the table that contains the statistics for this particular port. If this has a value of 0, no statistics are available for this port. The port type information helps identify the statistic objects found in the table. From this point, use the getnext command to get the next statistic object. When the first part of the OID changes, the end of table is reached. Mapped to connUnitPortStatFabricUnitId.
connUnitPortProtocolCap 1.3.6.1.3.94.1.10.1.20	Read only	This is the bitmask that specifies the driver-level protocol capability of this port. If this is not applicable, returns all bits set to 0. Return value = 07F The bits have the following definition. ■ 0 = unknown ■ 1 = Loop ■ 2 = Fabric ■ 4 = SCSI ■ 8 = TCP/IP ■ 16 = VI ■ 32 = FICON
connUnitPortProtocolOp 1.3.6.1.3.94.1.10.1.21	Read only	This is the bitmask that specifies the driver-level protocols that are currently operational. Return value = 07F If this is not applicable, returns all bits set to zero. The bits have the following definition: ■ 0 = unknown ■ 1 = Loop ■ 2 = Fabric ■ 4 = SCSI ■ 8 = TCP/IP ■ 16 = VI ■ 32 = FICON
connUnitPortNodeWwn 1.3.6.1.3.94.1.10.1.22	Read only	The node World Wide Name of the port, if applicable; otherwise, an empty string. All ports on HBAs on a host have the same node WWN. All ports on the same storage subsystem have the same node WWN. This is in IEEE Extended format, and the extension contains the internal port number of each port. The internal port number is 1 less than the port index. For example, if the switch has WWN 10:00:00:60:69:10:02:18, then port number 0 and 6 have WWN 20:00:00:60:69:10:02:18 and 20:06:00:60:69:10:02:18, respectively. However, the embedded port has WWN 10:00:00:60:69:10:02:18, the same as the switch. The N_Ports on a Brocade Access Gateway are the WWN of the switch (that is, it is the same as the connUnitId). The F_Ports are the WWN of the HBA host. If the F_Port is offline, the value of the WWN is zero (00:00:00:00:00:00:00:00).

Object and OID	Access	Description
connUnitPortHWState 1.3.6.1.3.94.1.10.1.23	Read only	The state of the port as detected by the hardware. Possible values are: - unknown (1) - failed (2) The port failed diagnostics (port_flt_state). - bypassed (3) FCAL bypass, loop only (not used). - active (4) Connected to a device (light and sync are present). - loopback (5) The port is in ext loopback (loopback state). - txfault (6) Transmitter fault (bad GBIC). - noMedia (7) The media not installed (GBIC removed). - linkDown (8) Waiting for activity—rx sync (light with no sync).
connUnitEventTable 1.3.6.1.3.94.1.11	Not accessible	The table of connectivity unit events. Errors, warnings, and information should be reported in this table. This table contains the 1024 most recent event log entries. Only external RASlog messages are supported. Fabric OS 4.4.0 and later releases do not have Panic or Debug level messages. All external messages are documented in the *Brocade Fabric OS Message Reference Manual*.
connUnitEventEntry 1.3.6.1.3.94.1.11.1	Not accessible	Each entry contains information on a specific event for the given connectivity unit.
connUnitEventUnitId 1.3.6.1.3.94.1.11.1.1	Read only	The connUnitId of the connectivity unit that contains this event table. Same as connUnitId.
connUnitEventIndex 1.3.6.1.3.94.1.11.1.2	Read only	Each connectivity unit has its own event buffer. As it wraps, it might write over previous events. This object is an index into the buffer. Read this table using "getNext"s to retrieve the initial table. The management application should read the event table at periodic intervals and then determine if any new entries were added by comparing the last known index value with the current highest index value. The management application should then update its copy of the event table. If the read interval is too long, it is possible that there might be events that might not be contained in the agent's internal event buffer. An agent might read events 50 through 75. At the next read interval, connUnitEventCurrID is 189. If the management application tries to read event index 76 and the agent's internal buffer is 100 entries maximum, event index 76 is no longer available. The index value is an incrementing integer that starts from 1 every time there is a table reset. On table reset, all contents are emptied and all indices are set to 0. When an event is added to the table, the event is assigned the next-higher integer value than the last item entered into the table. If the index value reaches its maximum value, the next item entered causes the index value to roll over and start at 1 again. Mapped to swEventIndex.

Object and OID	Access	Description
connUnitEventId 1.3.6.1.3.94.1.11.1.3	Read only	The internal event ID. Incriminated for each event, ranging between 0 and connUnitMaxEvents. Not used as table index to simplify the agent implementation. When this reaches the end of the range specified by connUnitMaxEvents, the ID rolls over to start at 0. This value is set back to 0 at reset. The relationship of this value to the index is that the internal event ID might represent a smaller number than a 32-bit integer (for example, a maximum of 100 entries) and would only have a value range up to connUnitMaxEvents. **NOTE:** This object is obsoleted.
connUnitREventTime 1.3.6.1.3.94.1.11.1.4	Read only	This is the real time when the event occurred. It has the following format. `DDMMYYYY HHMMSS` Where: DD = day number MM = month number YYYY = year HH = hours MM = minutes SS = seconds If not applicable, returns a null string.
connUnitSEventTime 1.3.6.1.3.94.1.11.1.5	Read only	This is the sysuptime timestamp when the event occurred.
connUnitEventSeverity 1.3.6.1.3.94.1.11.1.6	Read only	The event severity level. The mapping between the error log severity level and this variable is: **Error log** **FA-MIB** none (0) unknown (1) Critical (1) critical (4) Error (2) error (5) Warning (3) warning (6) Informational (4) info (8) Debug (5) debug (9) For more information about severity, see "FcEventSeverity" in Table 13.
connUnitEventType 1.3.6.1.3.94.1.11.1.7	Read only	The type of this event. Possible values are: ■ unknown (1) ■ other (2) ■ status (3) ■ configuration (4) ■ topology (5) Always set to 2 (other).
connUnitEventObject 1.3.6.1.3.94.1.11.1.8	Read only	This is used with the connUnitEventType to identify to which object the event refers. It can be the OID of a connectivity unit or of another object, like connUnitPortStatus. Always set to null.

Object and OID	Access	Description
connUnitEventDescr 1.3.6.1.3.94.1.11.1.9	Read only	The description of the event. Same as the string displayed in the system error log. The system error log can be viewed using the `errShow` or `errDump` commands. This field uses the message title and number (for example, WEBD-1006) and the message text. For more information on error messages, refer to the *Brocade Fabric OS Message Reference Manual*.
connUnitLinkTable 1.3.6.1.3.94.1.12	Not accessible	A list of links known to this agent from this connectivity unit to other connectivity units; X is switch data and Y is other end. The link table is intended to organize and communicate any information the agent has that might assist a management application to discover the connectivity units in the framework and the topology of their interconnect; the goal is to assist the management application by mapping the elements of the framework in addition to listing them. With this goal, the agent should include as much as it possesses about any links from its own connectivity units to others, including links among its own units. An agent should include partial information about links if it is not able to fully define them in accord with the following structure; however, the information must include either a nonzero connUnitNodeId or a nonzero connUnitPortWwn for each end of the link. If the agent is able to discover links that do not directly attach to members of its agency and its discovery algorithm gives some assurance that the links are recently valid, it might include these links. Link information entered by administrative action might be included even if not validated directly if the link has at least one endpoint in this agency, but it should not be included otherwise. A connectivity unit should fill in the table in as best it can. One of the methods to fill this in is to use the RNID ELS command (ANSI document 99-422v0). This command queries a port for the information needed for the link table. This table is accessed either directly, if the management software has an index value, or using getNext. The values of the indexes are not required to be contiguous. Each entry created in this table is assigned an index. This relationship is kept persistent until the entry is removed from the table or the system is reset. The total number of entries is defined by the size of the table. For an entry to be considered valid, both the X (local) and the Y (remote) values need to have one valid value.

Object and OID	Access	Description
connUnitLinkTable 1.3.6.1.3.94.1.12 (Cont.)	Not accessible	A Brocade Access Gateway has no ISLs (inter-switch links); therefore all F_Port and N_Port connections display in `ag --show` for online F_Ports. Dedicated ISLDISL: An ISL physically connected between two virtual switches that belong to the same VF ID. A DISL is dedicated to carrying frames only related to VF ID of connected virtual switches. Extended ISL XISL: An XISL belongs to the base fabric and by default carries frames of the base fabric and for other fabrics using the encapsulation and IFR header. Logical ISL LISL: A virtual link between two virtual switches that is used for control frames. An LISL might not map directly to a single physical ISL depending on the topology.
connUnitLinkEntry 1.3.6.1.3.94.1.12.1	Not accessible	An entry describing a particular link to another.
connUnitLinkUnitId 1.3.6.1.3.94.1.12.1.1	Read only	The connUnitId of the connectivity unit that contains this link table. Set to WWN of the local switch.
connUnitLinkIndex 1.3.6.1.3.94.1.12.1.2	Read only	This value is used to create a unique value for each entry in the link table with the same connUnitLinkUnitId. The value can be reused only if it is not currently in use and the value is the next candidate to be used. This value is allowed to wrap at the highest value represented by the number of bits. This value is reset to 0 when the system is reset, and the first value to be used is 1. Indexes 1 through maximum number of ports are reserved for ISL. Indexes maximum number of ports + 1 and above are reserved for end devices and are calculated based on the port ID of the end devices.
connUnitLinkNodeIdX 1.3.6.1.3.94.1.12.1.3	Read only	The node WWN of the unit at one end of the link. If the node WWN is unknown and the node is a connUnit in the responding agent, then the value of this object must be equal to its connUnitID. The WWN of the local switch.
connUnitLinkPortNumberX 1.3.6.1.3.94.1.12.1.4	Read only	The port number on the unit specified by connUnitLinkNodeIdX, if known; otherwise, -1. If the value is nonnegative, then it is equal to connUnitPortPhysicalNumber. ISL - The physical port number of the E_Port. Device - The physical port number to which the device is connected.
connUnitLinkPortWwnX 1.3.6.1.3.94.1.12.1.5	Read only	The port WWN of the unit specified by connUnitLinkNodeIdX, if known; otherwise, 16 octets of binary 0. This is the WWN of the port to which the device is connected.
connUnitLinkNodeIdY 1.3.6.1.3.94.1.12.1.6	Read only	The node WWN of the unit at the other end of the link. If the node WWN is unknown and the node is a connUnit in the responding SNMP agency, the value of this object must be equal to its connUnitID. ISL - The WWN of the remote switch. Device - The node name of the device.

Object and OID	Access	Description
connUnitLinkPortNumberY 1.3.6.1.3.94.1.12.1.7	Read only	The port number on the unit specified by connUnitLinkNodeIdY, if known; otherwise, –1. If the value is nonnegative, it is equal to connUnitPortPhysicalNumber. ISL - The physical port number of the remote port. Device: –1.
connUnitLinkPortWwnY 1.3.6.1.3.94.1.12.1.8	Read only	The port WWN on the unit specified by connUnitLinkNodeIdY, if known; otherwise, 16 octets of binary 0. ISL - The WWN of the remote port. Device - The port name.
connUnitLinkAgentAddressY 1.3.6.1.3.94.1.12.1.9	Read only	The address of an FCMGMT MIB agent for the node identified by connUnitLinkNodeIdY, if known; otherwise, 16 octets of binary 0. ISL - The IP address (IPv4). Device - 0 (Null).
connUnitLinkAgentAddressTypeY 1.3.6.1.3.94.1.12.1.10	Read only	If connUnitLinkAgentAddressY is nonzero, it is a protocol address. connUnitLinkAgentAddressTypeY is the "address family number" assigned by IANA to identify the address format (for example, 1 is IPv4, 2 is IPv6). ISL - Type 1. Device - 0 (Null).
connUnitLinkAgentPortY 1.3.6.1.3.94.1.12.1.11	Read only	The IP port number for the agent. This is provided in case the agent is at a nonstandard SNMP port. ISL - The IP port. Device - 0 (Null).
connUnitLinkUnitTypeY 1.3.6.1.3.94.1.12.1.12	Read only	The type of the FC connectivity unit, as defined in connUnitType. ■ ISL - The switch device. ■ End devices - End device types based on an FCP inquiry. Broadcom does not support hubs. Table 14 displays the connectivity unit types.
connUnitLinkConnIdY 1.3.6.1.3.94.1.12.1.13	Read only	This is the Fibre Channel ID of this port. If the connectivity unit is a switch, this is expected to be a big endian value of 24 bits. If this is a loop, it is the AL_PA that is connected. If this is an E_Port, it contains only the domain ID. If this is an F_Port or SIM_port, then it contains both the area and the domain ID. If it is not any of those, unknown or cascaded loop, returns all bits set to 1. ISL - The port ID of the remote port. Device - The Port ID of the remote port.
connUnitLinkCurrIndex 1.3.6.1.3.94.1.12.1.14	Read only	The last used link index.

Table 14: connUnitLinkUnitTypeY End Devices

Storage System	Storage Subsystem	Unknown	Other
Direct Access Sequential Access Write-Once CD-ROM Optical	Medium Changer Array SES	Unknown	Anything else (printer device, processor device, scanner, and so on)

8.3 Statistics Group

The port types are aggregated into a port type class, such as all the fabric port types.

Each individual port has only one statistics table. For all objects in the statistics table, if the object is not supported by the conn unit, then the high-order bit is set to 1, with all other bits set to 0 (for example, the last eight bytes of the returned value might be: 80 00 00 00 00 00 00 00).

The high-order bit is reserved to indicate whether the object is supported. All objects start at a value of 0 at hardware initialization and continue incrementing until 18,446,744,073,709,551,615 bits and then wrap to 0.

This is the case for all Class 1 frames; Brocade does not support them.

Object and OID	Access	Description
connUnitPortStatTable 1.3.6.1.3.94.4.5	Not accessible	A list of statistics for the fabric port types. **NOTE:** This table is specific to an FC port, so the object instance of its corresponding Ethernet and FCoE port's object values do not display when you issue `SNMP GET` or `SNMP WALK` command.
connUnitPortStatEntry 1.3.6.1.3.94.4.5.1	Not accessible	An entry describing port statistics.
connUnitPortStatUnitId 1.3.6.1.3.94.4.5.1.1	Read only	The connUnitId of the connectivity unit that contains this port statistics table.
connUnitPortStatIndex 1.3.6.1.3.94.4.5.1.2	Read only	This object represents the port index.
connUnitPortStatCountErro 1.3.6.1.3.94.4.5.1.3	Read only	A count of the errors that have occurred on this port.
connUnitPortStatCountTxObjects 1.3.6.1.3.94.4.5.1.4	Read only	The number of frames that have been transmitted by this port. A Fibre Channel frame starts with SOF and ends with EOF. FC loop devices should not count frames passed through. This value represents the sum total for all other transmitted objects.
connUnitPortStatCountRxObjects 1.3.6.1.3.94.4.5.1.5	Read only	The number of frames, packets, IOs, and so forth, that have been received by this port. A Fibre Channel frame starts with SOF and ends with EOF. FC loop devices should not count frames passed through. This value represents the sum total for all other received objects.

Object and OID	Access	Description
connUnitPortStatCountTxElements 1.3.6.1.3.94.4.5.1.6	Read only	The number of octets or bytes that have been transmitted by this port. There is a one-second periodic polling of the port. This value is saved and compared with the next polled value to compute net throughput.
connUnitPortStatCountRxElements 1.3.6.1.3.94.4.5.1.7	Read only	The number of octets or bytes that have been received by this port. There is a one-second periodic polling of the port. This value is saved and compared with the next polled value to compute net throughput.
connUnitPortStatCountBBCreditZero 1.3.6.1.3.94.4.5.1.8	Read only	The number of transitions in or out of the BB credit zero state.
connUnitPortStatCountInputBuffersFull 1.3.6.1.3.94.4.5.1.9	Read only	The number of occurrences when all input buffers of a port were full and outbound buffer-to-buffer credit transitioned to 0. There is no credit to provide to the other side. Return Value - 800000000 This is a Fibre Channel statistic only. **NOTE:** This object is not supported.
connUnitPortStatCountFBSYFrames 1.3.6.1.3.94.4.5.1.10	Read only	The number of times that FBSY was returned to this port as a result of a frame that could not be delivered to the other end of the link. This occurs if either the fabric or the destination port is temporarily busy. Th port can occur only on SOFc1 frames (the frames that establish a connection). This is a Fibre Channel only statistic. This is the sum of all classes. If you cannot keep the by-class counters, keep the sum counters. **NOTE:** This object is not supported.
connUnitPortStatCountPBSYFrames 1.3.6.1.3.94.4.5.1.11	Read only	The number of times that PBSY was returned to this port as a result of a frame that could not be delivered to the other end of the link. This occurs if the destination port is temporarily busy. PBSY can occur only on SOFc1 frames (the frames that establish a connection). Return Value - 800000000 This is a Fibre Channel only statistic. This is the sum of all classes. If you cannot keep the by-class counters, keep the sum counters. **NOTE:** This object is not supported.
connUnitPortStatCountFRJTFrames 1.3.6.1.3.94.4.5.1.12	Read only	The number of times that FRJT was returned to this port as a result of a frame that was rejected by the fabric. This is the total for all classes and is a Fibre Channel only statistic. **NOTE:** This object is not supported.
connUnitPortStatCountPRJTFrames 1.3.6.1.3.94.4.5.1.13	Read only	The number of times that PRJT was returned to this port as a result of a frame that was rejected at the destination N_Port. Return Value - 800000000 This is the total for all classes and is a Fibre Channel only statistic. **NOTE:** This object is not supported.

Object and OID	Access	Description
connUnitPortStatCountClass1RxFrames 1.3.6.1.3.94.4.5.1.14	Read only	The number of Class 1 frames received at this port. This is a Fibre Channel only statistic. Brocade does not support Class 1 Frames. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass1TxFrames 1.3.6.1.3.94.4.5.1.15	Read only	The number of Class 1 frames transmitted out this port. This is a Fibre Channel only statistic. Brocade does not support Class 1 Frames. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass1FBSYFrames 1.3.6.1.3.94.4.5.1.16	Read only	The number of times that FBSY was returned to this port as a result of a Class 1 frame that could not be delivered to the other end of the link. This occurs if either the fabric or the destination port is temporarily busy. FBSY can occur only on SOFc1 frames (the frames that establish a connection). This is a Fibre Channel only statistic. Brocade does not support Class 1 Frames. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass1PBSYFrames 1.3.6.1.3.94.4.5.1.17	Read only	The number of times that PBSY was returned to this port as a result of a Class 1 frame that could not be delivered to the other end of the link. This occurs if the destination N_Port is temporarily busy. PBSY can occur only on SOFc1 frames (the frames that establish a connection). This is a Fibre Channel only statistic. Brocade does not support Class 1 frames. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass1FRJTFrames 1.3.6.1.3.94.4.5.1.18	Read only	The number of times that FRJT was returned to this port as a result of a Class 1 frame that was rejected by the fabric. This is a Fibre Channel only statistic. Brocade does not support Class 1 Frames. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass1PRJTFrames 1.3.6.1.3.94.4.5.1.19	Read only	The number of times that PRJT was returned to this port as a result of a Class 1 frame that was rejected at the destination N_Port. This is a Fibre Channel only statistic. Brocade does not support Class 1 Frames. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass2RxFrames 1.3.6.1.3.94.4.5.1.20	Read only	The number of Class 2 frames received at this port. This is a Fibre Channel only statistic.
connUnitPortStatCountClass2TxFrames 1.3.6.1.3.94.4.5.1.21	Read only	The number of Class 2 frames transmitted out this port. This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.

Object and OID	Access	Description
connUnitPortStatCountClass2FBSYFrames 1.3.6.1.3.94.4.5.1.22	Read only	The number of times that FBSY was returned to this port because a Class 2 frame could not be delivered to the other end of the link. This occurs if either the fabric or the destination port is temporarily busy. FBSY can occur only on SOFc1 frames (the frames that establish a connection). This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass2PBSYFrames 1.3.6.1.3.94.4.5.1.23	Read only	The number of times that PBSY was returned to this port as a result of a Class 2 frame that could not be delivered to the other end of the link. This occurs if the destination N_Port is temporarily busy. PBSY can occur only on SOFc1 frames (the frames that establish a connection). This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass2FRJTFrames 1.3.6.1.3.94.4.5.1.24	Read only	The number of times that FRJT was returned to this port as a result of a Class 2 frame that was rejected by the fabric. This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass2PRJTFrames 1.3.6.1.3.94.4.5.1.25	Read only	The number of times that PRJT was returned to this port as a result of a Class 2 frame that was rejected at the destination N_Port. This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass3RxFrames 1.3.6.1.3.94.4.5.1.26	Read only	The number of Class 3 frames received at this port. This is a Fibre Channel only statistic.
connUnitPortStatCountClass3TxFrames 1.3.6.1.3.94.4.5.1.27	Read only	The number of Class 3 frames transmitted out this port. This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountClass3Discards 1.3.6.1.3.94.4.5.1.28	Read only	The number of Class 3 Frames that were discarded when received at this port. There is no FBSY or FRJT generated for Class 3 frames. They are discarded if they cannot be delivered. This is a sum of all Class 3 discards. This is a Fibre Channel only statistic.
connUnitPortStatCountRxMulticastObjects 1.3.6.1.3.94.4.5.1.29	Read only	The number of multicast frames or packets received at this port.
connUnitPortStatCountTxMulticastObjects 1.3.6.1.3.94.4.5.1.30	Read only	The number of multicast frames or packets transmitted out this port.

Object and OID	Access	Description
connUnitPortStatCountRxBroadcastObjects 1.3.6.1.3.94.4.5.1.31	Read only	The number of broadcast frames or packets received at this port. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountTxBroadcastObjects 1.3.6.1.3.94.4.5.1.32	Read only	The number of broadcast frames or packets transmitted out this port. On a Fibre Channel loop, counts only the OPNr frames generated. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountRxLinkResets 1.3.6.1.3.94.4.5.1.33	Read only	The number of link resets received. This is a Fibre Channel only statistic.
connUnitPortStatCountTxLinkResets 1.3.6.1.3.94.4.5.1.34	Read only	The number of link resets transmitted. This is a Fibre Channel only statistic.
connUnitPortStatCountNumberLinkResets 1.3.6.1.3.94.4.5.1.35	Read only	The number of link resets and LIPs detected at this port. The number of times that the reset link protocol is initiated. This is a count of the logical resets, a count of the number of primitives. This is a Fibre Channel only statistic. Return value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountRxOfflineSequences 1.3.6.1.3.94.4.5.1.36	Read only	The number of offline primitive OLSs received at this port. This is a Fibre Channel only statistic.
connUnitPortStatCountTxOfflineSequences 1.3.6.1.3.94.4.5.1.37	Read only	The number of offline primitive OLSs transmitted from this port. This is a Fibre Channel only statistic.
connUnitPortStatCountNumberOfflineSequences 1.3.6.1.3.94.4.5.1.38	Read only	The number of offline primitive sequence received at this port. This is a Fibre Channel only statistic. Return Value - 800000000 **NOTE:** This object is not supported.
connUnitPortStatCountLinkFailures 1.3.6.1.3.94.4.5.1.39	Read only	The number of link failures. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) This is a Fibre Channel only statistic.
connUnitPortStatCountInvalidCRC 1.3.6.1.3.94.4.5.1.40	Read only	The number of frames received with an invalid CRC. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) Loop ports should not count CRC errors passing through when monitoring. This is a Fibre Channel only statistic.
connUnitPortStatCountInvalidTxWords 1.3.6.1.3.94.4.5.1.41	Read only	The number of invalid transmission words received at this port. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) This is a Fibre Channel only statistic. This is the sum of encoding in and encoding out error.
connUnitPortStatCountPrimitiveSequenceProtoc olErrors 1.3.6.1.3.94.4.5.1.42	Read only	The number of primitive sequences protocol errors detected at this port. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) This is a Fibre Channel only statistic.

Object and OID	Access	Description
connUnitPortStatCountLossofSignal 1.3.6.1.3.94.4.5.1.43	Read only	The number of instances of signal loss detected at this port. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) This is a Fibre Channel only statistic.
connUnitPortStatCountLossofSynchronization 1.3.6.1.3.94.4.5.1.44	Read only	The number of instances of synchronization loss detected at this port. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8) This is a Fibre Channel only statistic.
connUnitPortStatCountInvalidOrderedSets 1.3.6.1.3.94.4.5.1.45	Read only	The number of invalid ordered sets received at port. This count is part of the Link Error Status Block (LESB). (FC-PH 29.8). This is a Fibre Channel only statistic.
connUnitPortStatCountFramesTooLong 1.3.6.1.3.94.4.5.1.46	Read only	The number of frames received at this port where the frame length was greater than what was agreed to in the FLOGI/PLOGI. This could be caused by losing the end-of-frame delimiter. This is a Fibre Channel only statistic.
connUnitPortStatCountFramesTruncated 1.3.6.1.3.94.4.5.1.47	Read only	The number of frames that are less than the Fibre Channel minimum frame size of 36 bytes.
connUnitPortStatCountAddressErrors 1.3.6.1.3.94.4.5.1.48	Read only	The number of frames received with unknown addressing. For example, unknown SID or DID. The SID or DID is not known to the routing algorithm. This is a Fibre Channel only statistic.
connUnitPortStatCountDelimiterErrors 1.3.6.1.3.94.4.5.1.49	Read only	The count of frames that have a bad start of frame or end of frame.
connUnitPortStatCountEncoding DisparityErrors 1.3.6.1.3.94.4.5.1.50	Read only	The number of encoding errors inside of frames.

8.4 Service Group

Implementation of the Service group is mandatory for all systems.

The Service group contains the following subgroups:

- Connectivity Unit Service Scalers group
- Connectivity Unit Service Tables group

Implementation of the Connectivity Unit Service Scalers group is mandatory for all systems.

Implementation of the Connectivity Unit Service Tables group is mandatory for all systems.

Object and OID	Access	Description
connUnitSnsMaxEntry 1.3.6.1.3.94.5.1.1	Read only	The maximum number of entries in the table.
connUnitSnsTable 1.3.6.1.3.94.5.2.1	Not accessible	This table contains an entry for each object registered with this port in the switch. A Brocade Access Gateway has no name server information; therefore this table is disabled.
connUnitSnsEntry 1.3.6.1.3.94.5.2.1.1	Not accessible	The simple name server (SNS) table for the port that is represented by connUnitSnsPortIndex.
IconnUnitSnsId 1.3.6.1.3.94.5.2.1.1.1	Read only	The connUnitId of the connectivity unit that contains this name server table.
connUnitSnsPortIndex 1.3.6.1.3.94.5.2.1.1.2	Read only	The physical port number of this SNS table entry. Each physical port has an SNS table with 1-n entries indexed by connUnitSnsPortIdentifier (port address).
connUnitSnsPortIdentifie r 1.3.6.1.3.94.5.2.1.1.3	Read only	The port identifier for this entry in the SNS table.
connUnitSnsPortName 1.3.6.1.3.94.5.2.1.1.4	Read only	The port name for this entry in the SNS table.
connUnitSnsNodeName 1.3.6.1.3.94.5.2.1.1.5	Read only	The node name for this entry in the SNS table.
connUnitSnsClassOfSvc 1.3.6.1.3.94.5.2.1.1.6	Read only	The classes of service offered by this entry in the SNS table.
connUnitSnsNodeIPAddress 1.3.6.1.3.94.5.2.1.1.7	Read only	The IPv6 formatted address of the node for this entry in the SNS table.
connUnitSnsProcAssoc 1.3.6.1.3.94.5.2.1.1.8	Read only	The process associator for this entry in the SNS table. Hard-coded to FF.
connUnitSnsFC4Type 1.3.6.1.3.94.5.2.1.1.9	Read only	The FC-4 types supported by this entry in the SNS table.
connUnitSnsPortType 1.3.6.1.3.94.5.2.1.1.10	Read only	The port type of this entry in the SNS table.
connUnitSnsPortIPAddress 1.3.6.1.3.94.5.2.1.1.11	Read only	The IPv6 formatted address of this entry in the SNS table.
connUnitSnsFabricPortName 1.3.6.1.3.94.5.2.1.1.12	Read only	The fabric port name of this entry in the SNS table.
connUnitSnsHardAddress 1.3.6.1.3.94.5.2.1.1.13	Read only	The hard address of this entry in the SNS table.

Object and OID	Access	Description
connUnitSnsSymbolicPortName 1.3.6.1.3.94.5.2.1.1.14	Read only	The symbolic port name of this entry in the SNS table. If the attached device has only the symbolic port name, the symbolic port name is shown and the symbolic node name appears as "null".
connUnitSnsSymbolic NodeName 1.3.6.1.3.94.5.2.1.1.15	Read only	The symbolic node name of this entry in the SNS table. If the attached device has only the symbolic node name, the symbolic node name is shown and the symbolic port name appears as "null".

8.5 SNMP Trap Registration Group

Object and OID	Access	Description
trapMaxClients 1.3.6.1.3.94.2.1	Read only	The maximum number of SNMP trap recipients supported by the connectivity unit. Set to 12.
trapClientCount 1.3.6.1.3.94.2.2	Read only	The current number of rows in the trap table.
trapRegTable 1.3.6.1.3.94.2.3	Not accessible	A table that contains a row for each IP address or port number to which traps are sent. **NOTE:** This object is not supported in Fabric OS 8.2.3 and later.
trapRegEntry 1.3.6.1.3.94.2.3.1	Not accessible	The IP/port pair for a specific client.
trapRegIpAddress 1.3.6.1.3.94.2.3.1.1	Read only	The IP address of a client registered for traps.
trapRegPort 1.3.6.1.3.94.2.3.1.2	Read only	The UDP port to send traps to for this host. Normally this would be the standard trap port (162). This object is an index and must be specified to create a row in this table. Set to 162.
trapRegFilter 1.3.6.1.3.94.2.3.1.3	Read-write	This value defines the trap severity filter for this trap host. The connUnit sends traps to this host that have a severity level less than or equal to this value. The default value of this object is Warning. The mapping between the error log severity level and this variable is shown in Table 15. For severity level, see "FcEventSeverity" in Table 13. The values 1, 3, 7, and 10 are not valid for SET operations.
trapRegRowState 1.3.6.1.3.94.2.3.1.4	Read-write	Specifies the state of the row. This entry always returns rowActive and allows for read only. For the state of the row, see Table 16.

Table 15: trapRegFilter for the Error Log Severity Level

System Error Log errshow Command	FA-MIB
none (0)	unknown (1)
Critical (1)	critical (4)
Error (2)	error (5)
Warning (3)	warning (6)
Info (4)	info (8)
Debug (5)	debug (9)

Table 16: trapRegRowState for Read/Write

State	Description (Read)	Description (Write)
rowDestroy (1)	Can never happen.	Remove this row from the table.
rowInactive (2)	Indicates that this row does exist but that traps are not enabled to be sent to the target.	If the row does not exist and the agent allows writes to the trap table, then a new row is created. The values of the optional columns are set to default values. Traps are not enabled to be sent to the target. If the row already exists, then traps are disabled from being sent to the target.
rowActive (3)	Indicates that this row exists and that traps are enabled to be sent to the target.	If the row does not exist and the agent allows writes to the trap table, then a new row is created. The values of the optional columns are set to default values. Traps are enabled to be sent to the target. If the row already exists, then traps are enabled to be sent to the target.

8.6 Revision Number Scalar

Object and OID	Access	Description
revisionNumber 1.3.6.1.3.94.3	Read only	This is the revision number for this MIB. The format of the revision value is as follows: 0 = High-order major revision number 1 = Low-order major revision number 2 = High-order minor revision number 3 = Low-order minor revision number The value is stored as an ASCII value. The following is the current value of this object. 0 = 0 1 = 3 2 = 0 3 = 0 The following example defines a revision of 03.00. Set to 0300.

8.7 Unsupported Tables

The Connectivity Unit Port Statistics Fabric Table (connUnitPortStatTable) is supported in Fabric OS; however Brocade does not support the following:

- Connectivity Unit Port Statistics Hub Table
- Connectivity Unit Port Statistics SCSI Table
- Connectivity Unit Port Statistics LAN/WAN Table

8.8 FibreAlliance MIB Traps

Trap Name and OID	Variables	Description

connUnitStatusChange
1.3.6.1.3.94.0.1
	connUnitStatus
	connUnitState
		The overall status of the connectivity unit has changed.
		Recommended severity level (for filtering) - alert.
		Generated when connUnitStatus changes. For a description of how the value is calculated, see "connUnitStatus" on page 108.
		Sample trap output for Fabric OS 8.0.1:
		`connUnitStatus.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.1 = warning(4)`
		`connUnitState.16.0.0.96.105.144.109.136.0.0.0.0.0.0.0.1 = offline(3)`
		For information on how the switch status is determined, refer to the *Brocade Fabric Watch Administrator's Guide*.

connUnitDeletedTrap 1.3.6.1.3.94.0.3	connUnitId	A connUnit has been deleted from this agent. Recommended severity level (for filtering) - warning. Not implemented.

Trap Name and OID	Variables	Description

connUnitEventTrap
1.3.6.1.3.94.0.4
	connUnitEventType
	connUnitEventObject
	connUnitEventDescr
		An event has been generated by the connectivity unit.
		Recommended severity level (for filtering) - info.
		Sample trap output for Fabric OS 8.0.1.
		
		`connUnitEventType.16.0.0.96.105.144.109.136.0`
		`.0.0.0.0.0.0.0.354 = other(2)`
		`connUnitEventObject.16.0.0.96.105.144.109.136`
		`.0.0.0.0.0.0.0.0.354 = null`
		`connUnitEventDescr.16.0.0.96.105.144.109.136.`
		`0.0.0.0.0.0.0.0.354 = FW-1425`
		`Switch status changed from MARGINAL to HEALTHY.`
		
		For more information, see "swEventTrap".

connUnitPortStatusChange
1.3.6.1.3.94.0.6
	connUnitPortStatus
	connUnitPortState
		Overall status of the connectivity unit changed.
		Recommended severity level (for filtering)- alert.
		This trap sends the instance of connUnitPortName as part of the trap; the instance string is NULL, if the port name is not defined for the specified port.
		Sample trap output for Fabric OS 8.0.1:
		`connUnitPortStatus.16.0.0.96.105.144.109.136.`
		`0.0.0.0.0.0.0.0.29 = ready(3)`
		`connUnitPortState.16.0.0.96.105.144.109.136.0`
		`.0.0.0.0.0.0.0.29 = online(2)`
		`connUnitPortName.16.0.0.96.105.144.109.136.0.`
		`0.0.0.0.0.0.0.29 = test`
		For more information, see "swFCPortScn".

Chapter 9: FibreAlliance Extension MIB Objects

9.1 FibreAlliance Extension MIB Overview

The MIB module is an extension for the FA MIB. The descriptions of each MIB variables in this chapter come directly from the FA-EXT-MIB itself.

NOTE: The port swap feature does not have any effect on SNMP for the FA-EXT-MIB.

The following depict the organization and structure of the FA-EXT-MIB file system.

FA-EXT-MIB Overall Tree Structure

```
- iso
   - org
      - dod
         - internet
            - private
               - enterprises
                  - bcsi
                     - commDev
                        - fibreChannel
                           - fcSwitch
                              - sw
                                 - faExt
                                    - swSfpStatTable
                                    - swFapwwnFeature
                                    - swPortConfigTable
                                    - swConnUnitPortTable
```

FA-EXT-MIB Hierarchy

```
- faExt (1.3.6.1.4.1.1588.2.1.1.1.28)
    - swSfpStatTable (1.3.6.1.4.1.1588.2.1.1.1.28.1)
        - swSfpStatEntry 1.3.6.1.4.1.1588.2.1.1.1.28.1.1
            - swSfpTemperature 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.1
            - swSfpVoltage 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.2
            - swSfpCurrent 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.3
            - swSfpRxPower 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.4
            - swSfpTxPower 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.5
            - swSfpPoweronHrs 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.6
            - swSfpUnitId 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.7
    - swFapwwnFeature 1.3.6.1.4.1.1588.2.1.1.1.28.2
        - swPortFapwwnConfig Table 1.3.6.1.4.1.1588.2.1.1.1.28.2.1
            - swPortFapwwnConfigEntry 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1
                - swPortFapwwnConfigEnable 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1.1
                - swPortFapwwnConfigFapwwn 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1.2
                - swPortFapwwnConfigType 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1.3
    - swPortConfigTable 1.3.6.1.4.1.1588.2.1.1.1.28.3
        - swPortConfigEntry 1.3.6.1.4.1.1588.2.1.1.1.28.3.1
            - swPortEncrypt 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.1
            - swPortCompression 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.2
            - swPortCipherKeySize 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.3
            - swPortCipherMode 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.4
    - swConnUnitPortTable 1.3.6.1.4.1.1588.2.1.1.1.28.4
        - swConnUnitPortEntry 1.3.6.1.4.1.1588.2.1.1.1.28.4.1
            - swConnUnitPortCapableSpeeds 1.3.6.1.4.1.1588.2.1.1.1.28.4.1.1
            - swConnUnitPortSpeedMode 1.3.6.1.4.1.1588.2.1.1.1.28.4.1.2
```

9.1.1 Textual Conventions for FA-EXT-MIB

The following table lists the textual conventions used for FA-EXT-MIB.

Table 17: Textual Conventions for FA-EXT-MIB

Type Definition	Value	Description
FapwwnType	Integer	Represents the type of FAPWWN assigned to the port. 1 unknown 2 auto 3 userConfigured
CiperMode	Integer	Represents the cipher mode. 1 none 2 allFrames 3 fcpAndNonFCP 4 onlyFCP
EncryptCompressStatus	Integer	Represents the status of the encryption or compression feature on a port. 1 enabled 2 disabled 3 unknown

9.2 SFP Statistics Table

Object and OID	Access	Description
swSfpStatTable 1.3.6.1.4.1.1588.2.1.1.1.28.1	Not accessible	This table represents the diagnostic statistics of small form-factor pluggable (SFP) optical transceivers.
swSfpStatEntry 1.3.6.1.4.1.1588.2.1.1.1.28.1.1	Not accessible	An entry containing the diagnostic statistics of SFPs.
swSfpTemperature 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.1	Read only	This object identifies the temperature of the SFP.
swSfpVoltage 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.2	Read only	This object identifies the voltage of the SFP.
swSfpCurrent 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.3	Read only	This object identifies the current of the SFP.
swSfpRxPower 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.4	Read only	This object identifies the received optical power of the SFP.
swSfpTxPower 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.5	Read only	This object identifies the transmitted optical power of the SFP.
swSfpPoweronHrs 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.6	Read only	This object identifies the power-on hours of the SFP. This is applicable only to 16-Gb SFPs.
swSfpUnitId 1.3.6.1.4.1.1588.2.1.1.1.28.1.1.7	Read only	This object identifies the unit ID of the SFP. This is applicable only to the quad small form-factor pluggable (QSFP).

NOTE: In the CLI output, the value of swSfpRxPower and swSfpTxPower is in a float data type. The float data type is not supported by SNMP, and hence the object is defined as an octet string. The value may start from minus infinity (" -in") to any floating number.

9.3 Port Configuration Table for the Fabric Assigned PWWN Feature

Object and OID	Access	Description
swFapwwnFeature 1.3.6.1.4.1.1588.2.1.1.1.28.2	Not accessible	The OID subtree for the Fabric Assigned PWWN (FAPWWN) feature.
swPortFapwwnConfigTable 1.3.6.1.4.1.1588.2.1.1.1.28.2.1	Not accessible	This table represents the FAPWWN configuration of ports.
swPortFapwwnConfigEntry 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1	Not accessible	An entry in this table that represents the FAPWWN configuration of ports.
swPortFapwwnConfigEnable 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1.1	Read only	This object indicates whether or not the FAPWWN is enabled on the port: ■ true (1) ■ false (2)

Object and OID	Access	Description
swPortFapwwnConfigFapwwn 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1.2	Read only	This object represents the FAPWWN assigned to the port. It returns the WWN irrespective of the state of the FAPWWN.
swPortFapwwnConfigType 1.3.6.1.4.1.1588.2.1.1.1.28.2.1.1.3	Read only	This object represents the type of FAPWWN. Valid values: ■ unknown (1) ■ auto (2) ■ userconfigured (3)

9.4 Port Configuration Table for the Encryption or Compression Feature

Object and OID	Access	Description
swPortConfigTable 1.3.6.1.4.1.1588.2.1.1.1.28.3	Not accessible	This table represents the configuration of the encryption or compression feature on a port.
swPortConfigEntry 1.3.6.1.4.1.1588.2.1.1.1.28.3.1	Not accessible	An entry in the table that represents the configuration of the encryption or compression feature on a port.
swPortEncrypt 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.1	Read only	This object represents the encryption status on a port. Valid values: ■ enabled - The port is enabled for encryption. ■ disabled - The port is not enabled for encryption.
swPortCompression 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.2	Read only	This object represents the compression status on a port. Valid values: ■ enabled - The port is enabled for compression. ■ disabled - The port is not enabled for compression.
swPortCipherKeySize 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.3	Read only	The object represents the cipher key size. Fabric OS supports 256 bytes per key.
swPortCipherMode 1.3.6.1.4.1.1588.2.1.1.1.28.3.1.4	Read only	This object represents the cipher mode. Valid values: ■ none (1) ■ allFrames (2) ■ fcpAndNonFCP (3) ■ onlyFCP (4)

9.5 Switch Connectivity Unit Port Table

Object and OID	Access	Description
swConnUnitPortTable 1.3.6.1.4.1.1588.2.1.1.1.28.4	Not accessible	This table represents all the port entries of the connectivity unit.
swConnUnitPortEntry 1.3.6.1.4.1.1588.2.1.1.1.28.4.1	Not accessible	This represents the port entry of the connectivity unit.
swConnUnitPortCapableSpeeds 1.3.6.1.4.1.1588.2.1.1.1.28.4.1.1	Read only	This represents the capable port speed of the connectivity unit.

Object and OID	Access	Description
swConnUnitPortSpeedMode 1.3.6.1.4.1.1588.2.1.1.1.28.4.1.2	Read only	This represents the configured speed mode of the particular port.
swConnUnitPortFECMode 1.3.6.1.4.1.1588.2.1.1.1.28.4.1.3	Read only	This represents the port Forward Error Correction (FEC) mode. The FEC feature is applicable only on 16G and 32G platforms.
swConnUnitPortFECState 1.3.6.1.4.1.1588.2.1.1.1.28.4.1.4	Read only	This represents the FEC state (active or inactive) of a port.

Chapter 10: MIB Object Groupings

10.1 Switch Variables

MIB variables that assist in monitoring or modifying the status of switches are in the following tables or groups.

10.2 Sensor Variables

MIB variables that assist in monitoring or modifying the status or state of fans, power supply, and temperature are in the following tables or groups.

10.3 Port Variables

MIB variables that assist in monitoring or modifying ports are in the following tables or groups.

10.3.1 Variables for State and Status

- fcFxPortTable
- fcFxConfTable
- fcFxPortStatusTable
- fcFxPortPhysTable
- fcFxPortCapTable

10.3.2 Variables for Statistics and Measurement

- fcFxPortErrorTable
- fcFxPortC2AccountingTable
- fcFeCapabilities group

10.4 Event Variables

MIB variables that assist in monitoring or modifying events are in the following tables or groups.

10.5 ISL and End Device Variables

MIB variables that assist in monitoring or modifying an inter-switch link and end devices are in the following tables or groups.

10.5.1 ISL Variables

10.5.2 End Device Variables

- fcFxLoginTable

10.6 SNMP Configuration Variables

MIB variables that assist in configuring SNMP are in the following tables or groups.

Chapter 11: Mapping of CLI Counters to MIB Objects

This chapter maps the counters displayed by CLI commands to the corresponding MIB objects.

11.1 portStatsShow Command

The following table lists the counters displayed by the `portStatsShow` command and the corresponding MIB objects.

Table 18: portStatsShow Command

Counters	Description	MIB Location	Counter Size
stat_wtx	The number of 4-byte words transmitted.	Object: connUnitPortStatCountTxElements multiplied by four Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.6	64 bits
stat_wrx	The number of 4-byte words received. The size of stat_wrx in `portstatsshow` is fixed for 32 bit: use `portstats64show` for 64-bit counters. If the stat_wrx counter is used for 64 bit, it wraps very quickly and the counter may not increment.	Object: connUnitPortStatCountRxElements multiplied by four Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.7	64 bits
stat_ftx	The number of class 2, class 3, and control frames transmitted.	Object: connUnitPortStatCountTxObjects Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.4	32 bits
stat_frx	The number of class 2, class 3, and control frames received.	Object: connUnitPortStatCountRxObjects Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.5	32 bits
stat_c2_frx	The number of class 2 frames received.	Object: connUnitPortStatCountClass2RxFrames Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.20	32 bits
stat_c3_frx	The number of class 3 frames received.	Object: connUnitPortStatCountClass3RxFrames Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.26	32 bits
stat_lc_rx	The number of link control frames received.	Object: swConnUnitLCRX Table name: swConnUnitPortStatExtentionTable OID: 1.3.6.1.4.1.1588.2.1.1.1.27.1.16–	32 bits
stat_mc_rx	The number of multicast frames received.	Object: connUnitPortStatCountRxMulticastObjects Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.29	32 bits
stat_mc_to	The number of multicast timeouts.	Not supported	—

Table 18: portStatsShow Command (Continued)

Counters	Description	MIB Location	Counter Size
stat_mc_tx	The number of multicast frames transmitted.	Object: connUnitPortStatCountTxMulticastObjects Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.30	32 bits
tim_rdy_pri	The number of times that sending R_RDY or VC_RDY primitive signals was a higher priority than sending frames, due to diminishing credit reserves in the transmitter at the other end of the fiber. This parameter is sampled at intervals of 1.8 microseconds, and the counter is incremented by 1 if the condition is true.	Object: swConnUnitRDYPriority Table name: swConnUnitPortStatExtentionTable OID: 1.3.6.1.4.1.1588.2.1.1.1.27.1.17	32 bits
tim_txcrd_z	The number of times that the port was unable to transmit frames because the transmit BB credit was zero. The purpose of this statistic is to detect congestion or a device affected by latency. This parameter is sampled at intervals of 2.5 microseconds, and the counter is incremented if the condition is true. Each sample represents 2.5 microseconds of time with zero Tx BB credit. An increment of this counter means that the frames could not be sent to the attached device for 2.5 microseconds, indicating degraded performance.	Object: connUnitPortStatCountBBCreditZero Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.8	32 bits
er_enc_in	The number of encoding errors inside frames.	Object: connUnitPortStatCountEncoding DisparityErrors Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.50	32 bits
er_crc	The number of frames with cyclic redundancy check (CRC) errors.	Object: swConnUnitCRCWithBadEOF Table name: swConnUnitPortStatExtentionTable OID: 1.3.6.1.4.1.1588.2.1.1.1.27.1.1	32 bits
er_trunc	The number of frames shorter than the minimum frame length.	Object: connUnitPortStatCountFramesTruncated Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.47	32 bits
er_toolong	The number of frames longer than the maximum frame length.	Object: connUnitPortStatCountFramesTooLong Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.50	32 bits
er_bad_eof	The number of frames with a bad end-of-frame.	Object: swConnUnitBadEOF Table name: swConnUnitPortStatExtentionTable OID: 1.3.6.1.4.1.1588.2.1.1.1.27.1.15	32 bits

Table 18: portStatsShow Command (Continued)

Counters	Description	MIB Location	Counter Size
er64_enc_out	The number of encoding error outside frames.	Object: connUnitPortStatCountEncoding DisparityErrors subtracted from connUnitPortStatCountInvalidTxWords Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.50 - 1.3.6.1.3.94.4.5.1.41	32 bits
er_bad_os	The number of invalid ordered sets (platform- and port-specific).	Object: connUnitPortStatCountInvalidOrderedSets Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.45	32 bits
er_rx_c3_timeout	The number of receive class 3 frames received at this port and discarded at the transmission port due to timeout (platform- and port-specific).	Not supported.	
er_tx_c3_timeout	The number of transmit class 3 frames discarded at the transmission port due to timeout (platform- and port-specific).	Not supported	
er_c3_dest_unreach	The number of class 3 frames discarded because the destination could not be reached. This field is specific to Condor 2-based platforms.	Not supported	
er_other_discard	The number of other discarded frames due to route lookup failures or other reasons.	Not supported	
er_unroutable	The number of unroutable frame counters.	Object: swConnUnitUnroutableFrameCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.30	32 bits
er_pcs_blk	The number of Physical Coding Sublayer (PCS) block errors. This counter records encoding violations on 10Gb/s or 16Gb/s ports. This is applicable only on platforms that support 10Gb/s or 16Gb/s ports.	Object: swConnUnitPCSErrorCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.29	32 bits
er_type1_miss	The number of FCR frames with transmit errors.	Object: swConnUnitFTB1Miss Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.10	32 bits
er_type2_miss	The number of frames with routing errors.	Object: swConnUnitFTB2Miss Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.11	32 bits
er_type6_miss	The number of FCR frames with receive errors.	Object: swConnUnitFTB6Miss Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.12	32 bits

Table 18: portStatsShow Command (Continued)

Counters	Description	MIB Location	Counter Size
er_zone_miss	The number of frames discarded due to a hard zoning miss. If Rx port hard zoning is enabled, frames will be discarded at the Rx port. If Tx port hard zoning is enabled, frames will be discarded at the Tx port. If both Rx and Tx port hard zoning is enabled, frames will be discarded at the Rx port.	Object: swConnUnitZoneMiss Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.13	32 bits
er_lun_zone_miss	The number of frames discarded due to a LUN zoning miss. (LUN zoning is currently not supported.)	Object: swConnUnitLunZoneMiss Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.14	32 bits
er_crc_good_eof	The number of CRC errors with a good end-of-frame (EOF) (platform- and port-specific).	Object: connUnitPortStatCountInvalidCRC Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.40	32 bits
er_inv_arb	The number of invalid arbitrated loops (ARBs).	Object: swConnUnitInvalidARB Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.9	32 bits
open	The number of times the FL_Port entered the OPEN state.	Object: swConnUnitOpen Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.8	32 bits
transfer	The number of times the FL_Port entered the TRANSFER state.	Object: swConnUnitTransferConnection Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.7	32 bits
opened	The number of times the FL_Port entered the OPENED state.	Object: swConnUnitOpend Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.6	32 bits
starve_stop	The number of loop tenancies stopped due to starvation.	Object: swConnUnitStopTenancyStarVation Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.5	32 bits
fl_tenancy	The number of times the FL_Port had a loop tenancy.	Object: swConnUnitFLNumOfTenancy Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.3	32 bits

Table 18: portStatsShow Command (Continued)

Counters	Description	MIB Location	Counter Size
nl_tenancy	The number of times the NL_Port had a loop tenancy.	Object: swConnUnitNLNumOfTenancy Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.4	32 bits
zero_tenancy	The number of times a zero tenancy occurred.	Object: swConnUnitZeroTenancy Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.2	32 bits

11.2 portErrShow Command

The following table lists the counters displayed by the portErrShow command and the corresponding MIB objects.

Table 19: portErrShow Command

Counters	Description	MIB Location	Counter Size
frames_tx	Number of frames transmitted (Tx).	Object: connUnitPortStatCountTxObjects Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.4	64 bits
frames_rx	Number of frames received (Rx).	Object: connUnitPortStatCountRxObjects Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.5	64 bits
er_enc_in	Number of encoding errors inside frames received (Rx).	Object: connUnitPortStatCountEncoding DisparityErrors Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.50	32 bits
crc_err	Number of frames with CRC errors received (Rx).	Object: swConnUnitCRCWithBadEOF Table name: swConnUnitPortStatExtentionTable OID: 1.3.6.1.4.1.1588.2.1.1.1.27.1.1	32 bits
crc_g_eof	Number of frames with CRC errors with a good EOF received (Rx).	Object: connUnitPortStatCountInvalidCRC Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.40	32 bits
too_short	Number of frames shorter than the minimum received (Rx).	Object: connUnitPortStatCountFramesTruncated Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.47	32 bits
too_long	Number of frames longer than the maximum received (Rx).	Object: connUnitPortStatCountFramesTooLong Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.46	32 bits

Table 19: portErrShow Command (Continued)

Counters	Description	MIB Location	Counter Size
bad_eof	Number of frames with bad end-of-frame delimiters received (Rx).	Object: swConnUnitBadEOF Table name: swConnUnitPortStatExtentionTable OID: 1.3.6.1.4.1.1588.2.1.1.1.27.1.15	32 bits
enc_out	Number of encoding errors outside of frames received (Rx).	Object: connUnitPortStatCountEncoding DisparityErrors subtracted from connUnitPortStatCountInvalidTxWords Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.50 - 1.3.6.1.3.94.4.5.1.41	32 bits
disc_c3	Number of class 3 frames discarded (Rx). This counter includes the sum of the following class 3 discard counters reported by the portStatsShow command: er_rx_c3_timeout, er_tx_c2_timeout, er_c2_dest_unreach, and er_other_disc. Refer to portStatsShow help for a description of these counters.	Object: connUnitPortStatCountClass3Discards Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.28	32 bits
link_fail	The number of link failures (LF1 or LF2 states) received (Rx).	Object: connUnitPortStatCountLinkFailures Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.39	32 bits
loss_of_sync	The number of times that synchronization was lost (Rx).	Object: connUnitPortStatCountLossofSynchronization Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.44	32 bits
loss_of_sig	The number of times that a loss of signal was received (increments whenever an SFP is removed) (Rx).	Object: connUnitPortStatCountLossofSignal Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.43	32 bits
frjt	The number of transmitted frames rejected with F_RJT (Tx).	Object: connUnitPortStatCountFRJTFrames Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.12	32 bits
fbsy	The number of transmitted frames busied with F_BSY (Tx).	Object: connUnitPortStatCountFBSYFrames Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.10	32 bits

11.3 portStats64Show Command

The following table lists the counters displayed by the portStats64Show command and the corresponding MIB objects.

Table 20: portStats64Show Command

Counters	Description	MIB Location	Counter Size
stat64_wtx	The number of 4-byte words transmitted.	Object: connUnitPortStatCountTxElements multiplied by four Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.6	64 bits
stat64_wrx	The number of 4-byte words received.	Object: connUnitPortStatCountRxElements multiplied by four Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.7	64 bits
stat64_ftx	The number of frames transmitted.	Object: connUnitPortStatCountTxObjects Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.4	64 bits
stat64_frx	Number of frames received.	Object: connUnitPortStatCountRxObjects Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.5	64 bits
stat64_c2_frx	The number of class 2 frames received.	Object: connUnitPortStatCountClass2RxFrames Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.20	64 bits
stat64_c3_frx	The number of class 3 frames received.	Object: connUnitPortStatCountClass3RxFrames Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.26	64 bits
stat64_lc_rx	The number of link control frames received.	Object: swConnUnitLCRX Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.16	64 bits
stat64_mc_rx	The number of multicast frames received.	Object: connUnitPortStatCountRxMulticastObjects Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.29	64 bits
stat64_mc_to	Number of multicast timeouts.	Not supported	
stat64_mc_tx	The number of multicast frames transmitted.	Object: connUnitPortStatCountTxMulticastObjects Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.30	64 bits
tim64_rdy_pri	The number of times that R_RDY was a high priority.	Object: swConnUnitRDYPriority Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.17	64 bits
tim64_txcrd_z	The number of times that the TX BB_credit was at zero.	Object: connUnitPortStatCountBBCreditZero Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.8	64 bits

Table 20: portStats64Show Command (Continued)

Counters	Description	MIB Location	Counter Size
er64_enc_in	The number of encoding errors inside of frames.	Object: connUnitPortStatCountEncoding DisparityErrors Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.50	64 bits
er64_crc	The number of frames with CRC errors.	Object: connUnitPortStatCountInvalidCRC Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.1	64 bits
er64_trunc	The number of frames shorter than the minimum.	Object: connUnitPortStatCountFramesTruncated Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.47	64 bits
er64_toolong	The number of frames longer than the maximum.	Object: connUnitPortStatCountFramesTooLong Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.50	64 bits
er64_bad_eof	The number of frames with a bad end-of-frame.	Object: swConnUnitBadEOF Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.15	64 bits
er64_enc_out	The number of encoding errors outside of frames.	Object: connUnitPortStatCountEncoding DisparityErrors subtracted from connUnitPortStatCountInvalidTxWords Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.50 - 1.3.6.1.3.94.4.5.1.41	64 bits
er64_disc_c3	The number of class 3 frames discarded.	Object: connUnitPortStatCountClass3Discards Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.28	64 bits
er64_pcs_blk	The number of Physical Coding Sublayer (PCS) block errors. This counter records encoding violations on 10Gb/s or 16Gb/s ports.	Object: swConnUnitPCSErrorCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.29	64 bits
stat64_fec_cor	The number of errors corrected by FEC.	Object: swConnUnitFECCorrectedCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.31 **NOTE:** This object is not supported on 32G platforms.	64 bits

Table 20: portStats64Show Command (Continued)

Counters	Description	MIB Location	Counter Size
stat64_fec_uncor	The number of errors left uncorrected by FEC.	Object: swConnUnitFECUnCorrectedCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.32	64 bits
stat64_PRJTFrames	The number of P_RJT frames transmitted.	Not supported	—
stat64_PBSYFrames	The number of P_BSY frames transmitted.	Not supported	—
stat64_inputBuffersFull	The number of occasions when input buffers are full.	Not supported	—
stat64_rxClass1Frames	The number of class 1 frames received.	Not supported	—

11.4 portShow Command

The following table lists the counters displayed by the `portShow` command and the corresponding MIB objects.

Table 21: portShow Command

Counters	Description	MIB Location	Counter Size
Interrupts	The total number of interrupts.	Object: swConnUnitInterrupts Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.19	32 bits
Unknown	Interrupts that are not counted elsewhere.	Object: swConnUnitUnknownInterrupts Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.20	32 bits
Lli	Low-level interface (physical state, primitive sequences).	Object: swConnUnitLli Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.18	32 bits
Proc_rqrd	Frames delivered for embedded N_Port processing.	Object: swConnUnitProcRequired Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.22	32 bits
Timed_out	Frames that have timed out.	Object: swConnUnitTimedOut Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.21	32 bits
portState	The state of the port.	Object: swConnUnitStateChange Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.24	32 bits
Tx_unavail	Frames returned from an unavailable transmitter.	Object: swConnUnitTxBufferUnavailable Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.23	32 bits

Table 21: portShow Command (Continued)

Counters	Description	MIB Location	Counter Size
er64_pcs_blk	The number of Physical Coding Sublayer (PCS) block errors. This counter records encoding violations on 10Gb/s or 16Gb/s ports.	Object: swConnUnitPCSErrorCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.29	32 bits
stat64_fec_uncor	The number of errors left uncorrected by FEC.	Object: swConnUnitFECUnCorrectedCounter Table name: swConnUnitPortStatExtentionTable OID:1.3.6.1.4.1.1588.2.1.1.1.27.1.32	32 bits
Link_failure	The number of link failures (LF1 or LF2 states) received (Rx).	Object: connUnitPortStatCountLinkFailures Table name: connUnitPortStatTable OID: 1.3.6.1.3.94.4.5.1.39	32 bits
Loss_of_sig	The number of times that a loss of signal was received (increments whenever an SFP is removed) (Rx).	Object: connUnitPortStatCountLossofSignal Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.43	32 bits
Loss_of_sync	The number of times that synchronization was lost (Rx).	Object: connUnitPortStatCountLossofSynchronization Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.44	32 bits
Protocol_err	Protocol errors.	Object: connUnitPortStatCountPrimitiveSequenceProtocolErrors Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.42	32 bits
Invalid_word	Encoding errors inside the frames.	Object: connUnitPortStatCountInvalidTxWords Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.41	32 bits
Invalid_crc	The number of invalid CRCs..	Object: connUnitPortStatCountInvalidCRC Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.40	32 bits
Delim_err	Delimiter error.	Object: connUnitPortStatCountDelimiterErrors Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.49	32 bits
Address_err	Address error.	Object: connUnitPortStatCountAddressErrors Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.48	32 bits
Lr_in	Link reset on the remote switch.	Object: connUnitPortStatCountTxLinkResets Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.34	32 bits
Lr_out	Link reset on the local switch.	Object: connUnitPortStatCountRxLinkResets Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.33	32 bits

Table 21: portShow Command (Continued)

Counters	Description	MIB Location	Counter Size
Ols_in	Inbound offline sequence.	Object: connUnitPortStatCountRxOfflineSequences Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.36	32 bits
Ols_out	Outbound offline sequence.	Object: connUnitPortStatCountTxOfflineSequences Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.37	32 bits
frjt	Number of transmitted frames rejected with F_RJT (Tx).	Object: connUnitPortStatCountFRJTFrames Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.12	32 bits
fbsy	Number of transmitted frames busied with F_BSY (Tx).	Object: connUnitPortStatCountFBSYFrames Table name: connUnitPortStatTable OID:1.3.6.1.3.94.4.5.1.10	32 bits

Revision History

FOS-82x-MIB-RM106; 30 April 2021

- Updated the description of the trapMaxClients object under "SNMP Trap Registration Group" on page 135.
- Added a note to the trapRegTable object under "SNMP Trap Registration Group" on page 135.

FOS-82x-MIB-RM105; 16 October 2020

- Updated the document for stylistic changes.

FOS-82x-MIB-RM104; 12 September 2019

- Added "FICON MIB Objects" on page 90.

FOS-821-MIB-RM103; 01 April 2019

- Updated the description of swEventIndex under "Event Group" on page 70.

FOS-821-MIB-RM102; 04 December 2018

- Updated the document for stylistic changes.

FOS-821-MIB-RM101; 28 September 2018

- Updated the document template.
- Added the "Revision History" chapter to the document.

FOS-821-MIB-RM100; 28 August 2018

- Updated the following MIB support for Access Gateway mode in "Access Gateway MIB Support" on page 17:
  - swConnUnitPortStatExtentionTable
  - swCpuOrMemoryUsage
  - swSfpStatTable
- Added a note to update information on swSfpRxPower and swSfpTxPower under "SFP Statistics Table" on page 141.