

Internet Draft

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8 January 2007

**Fibre-Channel Fabric Configuration Server MIB**  
**draft-ietf-imss-fc-fcs-mib-02.txt**

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for information related to the Fabric Configuration Server function of a Fibre Channel network.

## Table of Contents

<a href="#">1</a>	Introduction .....	<a href="#">3</a>
<a href="#">1.1</a>	Change Log .....	<a href="#">3</a>
<a href="#">2</a>	The Internet-Standard Management Framework .....	<a href="#">5</a>
<a href="#">3</a>	Short Overview of Fibre Channel .....	<a href="#">6</a>
<a href="#">4</a>	Relationship to Other MIBs .....	<a href="#">8</a>
<a href="#">5</a>	MIB Overview .....	<a href="#">8</a>
<a href="#">5.1</a>	Fibre Channel management instance .....	<a href="#">8</a>
<a href="#">5.2</a>	Switch Index .....	<a href="#">9</a>
<a href="#">5.3</a>	Fabric Index .....	<a href="#">9</a>
<a href="#">5.4</a>	The MIB Groups .....	<a href="#">9</a>
<a href="#">5.5</a>	OS LUN Map Entries .....	<a href="#">11</a>
<a href="#">6</a>	The T11-FC-FABRIC-CONFIG-SERVER-MIB Module .....	<a href="#">11</a>
<a href="#">7</a>	Acknowledgements .....	<a href="#">49</a>
<a href="#">8</a>	Normative References .....	<a href="#">50</a>
<a href="#">9</a>	Informative References .....	<a href="#">51</a>
<a href="#">10</a>	Authors' Addresses .....	<a href="#">52</a>
<a href="#">11</a>	IANA Considerations .....	<a href="#">52</a>
<a href="#">12</a>	Security Considerations .....	<a href="#">52</a>

## **1. Introduction**

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for information related to a Fibre Channel network's Fabric Configuration Server function which provides a means by which a management application can discover Fibre Channel fabric topology and attributes. Discovered topology includes Interconnect Elements (i.e., switches, hubs, bridges, etc.) and their ports, as well as "platforms" which consist of one or more Fibre Channel nodes.

This memo was previously approved by T11.5 (<http://www.t11.org>); it is currently a work item of the IETF's IMSS working group.

This memo includes boilerplate which uses only one of the following terms, but is nevertheless required to mention all of the keywords in the following statement:

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [BCP 14](#), [RFC 2119](#) [[RFC2119](#)].

### **1.1. Change Log**

This section to be deleted before publication as an RFC.

#### **1.1.1. Initial version**

The initial version was submitted on 30 September 2005 to T11.5 as T11/05-683v0 and to the IETF as [draft-kzm-imss-fc-fcs-mib-00.txt](#).

#### **1.1.2. Changes made in 17 December version**

The following changes were made for the version dated 17 December 2005, which was submitted to T11.5 as: 05-683v1, and to the IETF as: [draft-kzm-imss-fc-fcs-mib-01.txt](#).

- Added [section 5.5](#) on OS LUN Map entries.
- Defined a new object, `t11FcsRejectReasonVendorCode`, to record the value of the Reason Vendor Specific Code in the most recently reject of a request, and included in the `t11FcsRqRejectNotification` notification.

Expires July 2007

[Page 3]

- Added URLs for the T11 specifications in the Reference section.
- Several editorial changes.

#### **1.1.3. Changes made in 5 March version**

The following changes were made for the version dated 5 March 2006, which was submitted to T11.5 as: T11/06-197v0, and to the IETF as: [draft-kzm-imss-fc-fcs-mib-02.txt](#).

- Changed "Rx" to "In" and "Tx" to "Out" in the descriptors of Counter32's, e.g., changed t11FcsRxGetReqs to t11FcsInGetReqs.
- Deleted the t11FcsTxRscns and t11FcsRxRscns counters. (More detailed counters are being added to the RSCN-MIB instead.)
- Many editorial changes.

#### **1.1.4. 14 August 2006 version**

The following changes were made for the version was submitted to the IETF as: [draft-ietf-imss-fc-fcs-mib-00.txt](#).

- Changes to indicate the adoption of this memo as a work item of the IMSS Working Group.
- Added explicit statement to all Counter32's that they have no discontinuities other than those that all Counter32s have when sysUpTime=0.
- Updated references to FC-SW-4 to point at "ANSI INCITS 418-2006".

#### **1.1.5. 16 October 2006 version**

The following changes were made to address comments received in the IMSS WG Last Call, and this version was submitted to the IETF as: [draft-ietf-imss-fc-fcs-mib-01.txt](#).

- Updated references to FC-GS-5 to point at "ANSI INCITS 427-2006", and updated the section/table numbers which had changed from the previous version.
- The TC's were renamed to have a common prefix of T11Fc...

Expires July 2007

[Page 4]

- DISPLAY-HINTs were added for T11ListIndex and T11ListIndexPointerOrZero.
- The DESCRIPTIONs of t11FcsFabricDiscoveryRangeLow and t11FcsFabricDiscoveryRangeHigh were clarified to indicate the range is inclusive.
- Explicit size ranges were added for t11FcsIeName, t11FcsIeFabricName, t11FcsPortName and t11FcsNodeName.
- The URLString TC was imported for use as the syntax of t11FcsMgmtAddr.
- The t11FcsReqRejectNotify notification was renamed to t11FcsRqRejectNotification.
- Text was added to explain why flow-control is not needed for the notifications in this MIB module.
- The syntax of t11FcsPlatformName was changed to reflect that it always contains a format character, even if the name is of zero length.
- The t11FcsPortListTable, and the object t11FcsIePortListIndex which pointed into it, were deleted. Instead, t11FcsIeName was added into the INDEX of the t11FcsPortTable.

#### **1.1.6. 8 January 2007 version**

The following changes were made to address comments received, and this version was submitted to the IETF as:

[draft-ietf-imss-fc-fcs-mib-02.txt](#).

- Added IETF IMSS WG to the ORGANIZATION clause.
- Added a WRITE-SYNTAX clause for t11FcsDiscoveryStatus in the MODULE-COMPLIANCE statement.
- Changed all the copyright dates to 2007.

## **2. The Internet-Standard Management Framework**

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7](#) of

Expires July 2007

[Page 5]

[RFC 3410](#) [[RFC3410](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

### **3. Short Overview of Fibre Channel**

The Fibre Channel (FC) is logically a bidirectional point-to-point serial data channel, structured for high performance. Fibre Channel provides a general transport vehicle for higher level protocols such as Small Computer System Interface (SCSI) command sets, the High-Performance Parallel Interface (HIPPI) data framing, IP (Internet Protocol), IEEE 802.2, and others.

Physically, Fibre Channel is an interconnection of multiple communication points, called N\_Ports, interconnected either by a switching network, called a Fabric, or by a point-to-point link. A Fibre Channel "node" consists of one or more N\_Ports. A Fabric may consist of multiple Interconnect Elements, some of which are switches. An N\_Port connects to the Fabric via a port on a switch called an F\_Port. When multiple FC nodes are connected to a single port on a switch via an "Arbitrated Loop" topology, the switch port is called an FL\_Port, and the nodes' ports are called NL\_Ports. The term Nx\_Port is used to refer to either an N\_Port or an NL\_Port. The term Fx\_Port is used to refer to either an F\_Port or an FL\_Port. A switch port, which is interconnected to another switch port via an Inter-Switch Link (ISL), is called an E\_Port. A B\_Port connects a bridge device with an E\_Port on a switch; a B\_Port provides a subset of E\_Port functionality.

Many Fibre Channel components, including the fabric, each node, and most ports, have globally-unique names. These globally-unique names are typically formatted as World Wide Names (WWNs). More information on WWNs can be found in [[FC-FS](#)]. WWNs are expected to be persistent across agent and unit resets.

Fibre Channel frames contain 24-bit address identifiers which identify the frame's source and destination ports. Each FC port has

Expires July 2007

[Page 6]

both an address identifier and a WWN. When a fabric is in use, the FC address identifiers are dynamic and are assigned by a switch. Each octet of a 24-bit address represents a level in an address hierarchy, with a Domain\_ID being the highest level of the hierarchy.

The Fibre Channel Fabric Configuration Server provides a way for a management application to discover Fibre Channel fabric topology and attributes. The Fabric Configuration Server is designed so that it can be distributed among switches and accessed from any Nx\_Port. However, the Fabric Configuration Server is not restricted or required to be part of/within a fabric.

The information registered with and available from each Fabric Configuration Server is modelled as a fabric consisting of one or more Interconnect Elements, that each have some number of physical Ports, and one or more Fibre Channel nodes grouped together into Platforms to facilitate discovery and management. The Ports are connected either to other Ports on other Interconnect Elements, or to Nx\_Ports. Each Interconnect Element may have attributes including its name, type, Domain Identifier, Management Identifier, Logical Name, Management Address(es), Information List, Zoning Enforcement Status, etc. Each Port may have attributes including its name, type, TX type, Module type, physical port number, attached port name(s), port state, speed, etc. Each platform may have attributes including its name, type, description, label, location, management address, etc.

The Fibre Channel Fabric Configuration Server is defined in the FC-GS specification. The Fabric Configuration Server is one of a set of functions which are collectively known as the Management Service. The latest version of the specification is [[FC-GS-5](#)].

The latest standard for an interconnecting Fabric containing multiple Fabric Switch elements is [[FC-SW-4](#)]. [[FC-SW-4](#)] carries forward the earlier specification for the operation of a single Fabric in a physical infrastructure, and augments it with the definition of Virtual Fabrics and with the specification of how multiple Virtual Fabrics can operate within one (or more) physical infrastructures. The use of Virtual Fabrics provides for each frame to be tagged in its header to indicate which one of several Virtual Fabrics that frame is being transmitted on. All frames entering a particular "Core Switch" [[FC-SW-4](#)] (i.e., a physical switch) on the same Virtual Fabric are processed by the same "Virtual Switch" within that Core switch.

Expires July 2007

[Page 7]

#### **4. Relationship to Other MIBs**

The first standardized MIB for Fibre Channel [[RFC2837](#)] was focussed on Fibre Channel switches. It has been replaced by the more generic Fibre Channel Management MIB [[RFC4044](#)] which defines basic information for Fibre Channel hosts and switches, including extensions to the standard IF-MIB for Fibre Channel interfaces.

This MIB extends beyond [[RFC4044](#)] to cover the functionality, in Fibre Channel switches, of providing Fibre Channel's Fabric Configuration Server function.

This MIB imports some common Textual Conventions from T11-TC-MIB [[RFC4439](#)] and from T11-FC-NAME-SERVER-MIB [[RFC4438](#)]. It also imports URLString from NETWORK-SERVICES-MIB [[RFC2788](#)].

#### **5. MIB Overview**

This MIB module provides the means for monitoring the operation of, and configuring some parameters of, one or more Fabric Configuration Servers (FCS) in a Fibre Channel (FC) network. The capabilities provided include triggering a discovery of the configuration of one or more Fabrics, retrieving the results of such a discovery, as well as controlling and monitoring the operation of an FCS. The discovered configuration contains information about:

- Interconnect Elements (IEs), i.e., switches, hubs, bridges, etc.,
- Ports on IEs, and
- Platforms which consist of one or more FC nodes.

##### **5.1. Fibre Channel management instance**

A Fibre Channel management instance is defined in [[RFC4044](#)] as a separable managed instance of Fibre Channel functionality. Fibre Channel functionality may be grouped into Fibre Channel management instances in whatever way is most convenient for the implementation(s). For example, one such grouping accommodates a single SNMP agent having multiple AgentX [[RFC2741](#)] sub-agents, with each sub-agent implementing a different Fibre Channel management instance.

The object, fcmInstanceIndex, is IMPORTed from the FC-MGMT-MIB [[RFC4044](#)] as the index value to uniquely identify each Fibre Channel management instance, for example within the same SNMP context

Expires July 2007

[Page 8]

([\[RFC3411\]](#) section 3.3.1).

## **5.2. Switch Index**

The FC-MGMT-MIB [[RFC4044](#)] defines the fcmSwitchTable as a table of information about Fibre Channel switches which are managed by Fibre Channel management instances. Each Fibre Channel management instance can manage one or more Fibre Channel switches. The Switch Index, fcmSwitchIndex, is IMPORTed from the FC-MGMT-MIB as the index value to uniquely identify a Fibre Channel switch amongst those (one or more) managed by the same Fibre Channel management instance.

## **5.3. Fabric Index**

With multiple fabrics, each fabric has its own own instances of the fabric-related management instrumentation. Thus, this MIB defines all Fabric-related information in tables which are INDEX-ed by an arbitrary integer, named a "Fabric Index". The syntax of a Fabric Index is T11FabricIndex, imported from T11-TC-MIB [[RFC4439](#)]. When a device is connected to a single physical Fabric, without use of any virtual Fabrics, the value of this Fabric Index will always be 1. In an environment of multiple virtual and/or physical Fabrics, this index provides a means to distinguish one Fabric from another.

It is quite possible, and may even be likely, that a Fibre Channel switch will have ports connected to multiple virtual and/or physical Fabrics. Thus, in order to simplify a management protocol query concerning all the Fabrics to which a single switch is connected, fcmSwitchIndex will be listed before t11FcsFabricIndex when they both appear in the same INDEX clause.

## **5.4. The MIB Groups**

This section describes the six MIB groups contained in the MIB module.

### **5.4.1. The t11FcsDiscoveredConfigGroup group**

This group contains the fabric configuration information discovered by Fabric Configuration Servers.

### **5.4.2. The t11FcsDiscoveryStatusGroup group**

This group contains objects by which to monitor the status of discovery of fabric configurations by Fabric Configuration Servers."

Expires July 2007

[Page 9]

#### **5.4.3. The t11FcsDiscoveryControlGroup group**

This group contains objects for requesting a Fabric Configuration Server to discover the configuration of one or more fabrics.

#### **5.4.4. The t11FcsStatisticsGroup group**

This group contains objects for Fabric Configuration Server statistics information.

#### **5.4.5. The t11FcsNotificationGroup group**

This group contains three notifications, generated when an FCS:

- rejects a registration, deregistration or query request;
- completes discovery on a range of fabrics;
- learns that a management address of an Interconnect Element has changed.

##### **5.4.5.1. Flow Control for Notifications**

When defining SNMP notifications for events which occur in the data-plane, the maximum frequency of their generation needs to be considered. Unless there is some limiting factor, such notifications need to be flow-controlled in some way, e.g., defined such that after some maximum number within a specified time interval have occurred, further notifications are suppressed for some subsequent time interval. However, as and when such a suppression occurs, the NMS which didn't receive the notifications (because they were suppressed) needs to be able to obtain an indication of how many were suppressed. Therefore, an additional Counter32 object needs to be defined, and/or a new type of notification needs to be defined for use at the end of the interval. While this is extra complexity, it is necessary for notifications which need to be flow-controlled.

In contrast, for notifications such as all the ones defined in this MIB module, which are generated due to control plane events (and are not able to start a chain-reaction):

- estimating the maximum number that could possibly be generated per unit time for each type of notification is too simplistic. E.g., it's unreasonable to ask how many of the t11FcsDiscoveryCompleteNotify notifications can be generated in a time interval, because it depends on: how big is the network; how many virtual fabrics need to be discovered; how quickly can the operator ask for another discovery after

Expires July 2007

[Page 10]

the last one completes ?? and

- the extra complexity of flow-controlling these types of notifications is not warranted.

#### **5.4.6. The t11FcsNotificationInfoGroup group**

This group contains notification control and notification information objects for monitoring Fabric Configuration Server request rejection and discovery of topology information.

### **5.5. OS LUN Map Entries**

A "Platform" is defined in FC-GS-5 to be not only a set of zero or more FC nodes, but also a set of zero or more "OS LUN Map Entries" (see Figure 8 in [FC-GS-5]). Information on "OS LUN Map Entries" is not included in this T11-FC-FABRIC-CONFIG-SERVER-MIB. Instead, information on LUN Maps can be obtained via the scsiLunMapGroup object group defined in the SCSI-MIB [SCSI-MIB].

## **6. The T11-FC-FABRIC-CONFIG-SERVER-MIB Module**

T11-FC-FABRIC-CONFIG-SERVER-MIB DEFINITIONS ::= BEGIN

### IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE,
NOTIFICATION-TYPE, mib-2, Counter32, Unsigned32
    FROM SNMPv2-SMI -- [RFC2578]
MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
    FROM SNMPv2-CONF -- [RFC2580]
TEXTUAL-CONVENTION, TruthValue, TimeStamp
    FROM SNMPv2-TC -- [RFC2579]
SnmAdminString
    FROM SNMP-FRAMEWORK-MIB -- [RFC3411]
URLString
    FROM NETWORK-SERVICES-MIB -- [RFC2788]

FcPortType, FcNameIdOrZero, FcDomainIdOrZero,
fcmInstanceIndex, fcmSwitchIndex, FcAddressIdOrZero
    FROM FC-MGMT-MIB -- [RFC4044]
T11NsGs4RejectReasonCode
    FROM T11-FC-NAME-SERVER-MIB -- [RFC4438]
T11FabricIndex
```

Expires July 2007

[Page 11]

```
FROM T11-TC-MIB -- [RFC4439]
t11FamLocalSwitchWwn
FROM T11-FC-FABRIC-ADDR-MGR-MIB; -- [RFC4439]
```

t11FcFabricConfigServerMIB MODULE-IDENTITY

LAST-UPDATED "200701080000Z"

ORGANIZATION "For the initial versions, T11.  
For later versions, the IETF's IMSS Working Group."

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DESCRIPTION

"The MIB module for the management of a Fabric Configuration Server (FCS) in a Fibre Channel (FC) network. An FCS is defined by the FC-GS-5 standard. This MIB provides the capabilities to trigger a discovery of the configuration of one or more Fabrics, to retrieve the results of such a discovery, as well as to control and monitor the operation of an FCS. The discovered configuration contains information about:

- Interconnect Elements (IEs), i.e., switches, hubs, bridges, etc.,
- Ports on IEs, and
- Platforms which consist of one or more FC nodes.

Copyright (C) The IETF Trust (2007). This version of this MIB module is part of RFC yyyy; see the RFC itself for full legal notices."

-- RFC Editor: replace yyyy with actual RFC number & remove this note

REVISION "200701080000Z"

DESCRIPTION

"Initial version of this MIB module, published as RFCyyyy."

-- RFC-Editor, replace yyyy with actual RFC number & remove this note

::= { mib-2 nnn } -- to be assigned by IANA

Expires July 2007

[Page 12]

-- RFC Editor: replace nnn with IANA-assigned number & remove this note

```
t11FcsMIBObjects      OBJECT IDENTIFIER
                        ::= { t11FcFabricConfigServerMIB 1 }
t11FcsMIBConformance OBJECT IDENTIFIER
                        ::= { t11FcFabricConfigServerMIB 2 }
t11FcsNotifications  OBJECT IDENTIFIER
                        ::= { t11FcFabricConfigServerMIB 0 }
```

```
t11FcsDiscovery       OBJECT IDENTIFIER ::= { t11FcsMIBObjects 1 }
t11FcsDiscoveredConfig OBJECT IDENTIFIER ::= { t11FcsMIBObjects 2 }
t11FcsStats           OBJECT IDENTIFIER ::= { t11FcsMIBObjects 3 }
t11FcsNotificationInfo OBJECT IDENTIFIER ::= { t11FcsMIBObjects 4 }
```

--  
-- Textual Conventions  
--

```
T11FcListIndex ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS current
    DESCRIPTION
        "An index which identifies a list of elements.
        All elements which belong to the same list have the
        same index value. This syntax is used for objects
        which identify a list in the INDEX clause of a table
        of elements of that type of list."
    SYNTAX Unsigned32 (1..4294967295)
```

```
T11FcListIndexPointerOrZero ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS current
    DESCRIPTION
        "Objects with this syntax point to a list of elements
        contained in a table, by holding the same value as the
        object with syntax T11FcListIndex defined in the table's
        INDEX clause, or, zero to indicate an empty list.
        Note that such a table could have one row per list, or
        it could have one row per element of a list.

        The definition of an object with this syntax must
        identify the table(s) into which it points."
    SYNTAX Unsigned32 -- the default range of (0..4294967295)
```

```
T11FcIeType ::= TEXTUAL-CONVENTION
```

Expires July 2007

[Page 13]

STATUS current

DESCRIPTION

"The type of Interconnect Element (IE):

unknown(1) - an unknown IE.  
other(2) - some other type of IE.  
switch(3) - the IE is a switch.  
hub(4) - the IE is a hub.  
bridge(5) - the IE is a bridge."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, Table 96."

SYNTAX INTEGER {

unknown(1),  
other(2),  
switch(3),  
hub(4),  
bridge(5)

}

T11FcPortState ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The state of a port:

unknown(1) - unknown state.  
other(2) - some other state.  
online(3) - port is in online state.  
offline(4) - port is in offline state.  
testing(5) - port is in testing state.  
fault(6) - port is faulty."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, Table 106."

SYNTAX INTEGER {

unknown(1),  
other(2),  
online(3),  
offline(4),  
testing(5),  
fault(6)

}

T11FcPortTxType ::= TEXTUAL-CONVENTION

STATUS current

Expires July 2007

[Page 14]

## DESCRIPTION

"The technology of the port transceiver:

unknown(1) - unknown (includes the 'null' type)  
other(2) - some other technology  
shortwave850nm(3) - Short wave laser - SN (850 nm)  
longwave1550nm(4) - Long wave laser - LL (1550 nm)  
longwave1310nm(5) - Long wave laser cost  
reduced - LC (1310 nm)  
electrical(6) - Electrical - EL.  
tenGbaseSr850(7) - 10GBASE-SR 850nm laser  
tenGbaseLr1310(8) - 10GBASE-LR 1310nm laser  
tenGbaseEr1550(9) - 10GBASE-ER 1550nm laser  
tenGbaseLx1300(10) - 10GBASE-LX4 WDM 1300nm laser  
tenGbaseSw850(11) - 10GBASE-SW 850nm laser  
tenGbaseLw1310(12) - 10GBASE-LW 1310nm laser  
tenGbaseEw1550(13) - 10GBASE-EW 1550nm laser

"

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, Table 101."

## SYNTAX INTEGER {

unknown(1),  
other(2),  
shortwave850nm(3),  
longwave1550nm(4),  
longwave1310nm(5),  
electrical(6),  
tenGbaseSr850(7),  
tenGbaseLr1310(8),  
tenGbaseEr1550(9),  
tenGbaseLx1300(10),  
tenGbaseSw850(11),  
tenGbaseLw1310(12),  
tenGbaseEw1550(13)

}

T11FcsRejectReasonExplanation ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"The reject reason code explanation:

noAdditionalExplanation(1)  
- no additional explanation.  
invNameIdForIEOrPort(2)

Expires July 2007

[Page 15]

- the format of IE or port name is invalid.

ieListNotAvailable(3)

- IE list is not available.

ieTypeNotAvailable(4)

- IE type is not available.

domainIdNotAvailable(5)

- Domain ID is not available.

mgmtIdNotAvailable(6)

- mgmt ID is not available.

fabNameNotAvailable(7)

- Fabric\_Name is not available.

ieLogNameNotAvailable(8)

- IE logical name is not available.

mgmtAddrListNotAvailable(9)

- mgmt address list is not available.

ieInfoListNotAvailable(10)

- IE info list is not available.

portListNotAvailable(11)

- port list is not available.

portTypeNotAvailable(12)

- port type is not available.

phyPortNumNotAvailable(13)

- physical port number is not available.

attPortNameListNotAvailable(14)

- attached port name list is not available.

portStateNotAvailable(15)

- port state is not available.

unableToRegIELogName(16)

- not able to register IE logical name.

platformNameNoExist(17)

- platform name does not exist.

platformNameAlreadyExists(18)

- platform name already exists.

platformNodeNameNoExists(19)

- platform node name does not exist.

platformNodeNameAlreadyExists(20)

- platform node name already exists.

resourceUnavailable(21)

- resource unavailable.

noEntriesInLunMap(22)

- zero entries in OS LUN Map.

invalidDeviceNameLength(23)

- invalid OS device name length.

multipleAttributes(24)

- multiple attributes of same type in

Expires July 2007

[Page 16]

```
        platform attribute block.
invalidAttribBlockLength(25)
    - invalid platform attribute block length.
attributesMissing(26)
    - required platform attributes not present."
```

## REFERENCE

```
"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,
FC-GS-5, Table 124."
```

```
SYNTAX  INTEGER {
    noAdditionalExplanation(1),
    invNameIdForIEOrPort(2),
    ieListNotAvailable(3),
    ieTypeNotAvailable(4),
    domainIdNotAvailable(5),
    mgmtIdNotAvailable(6),
    fabNameNotAvailable(7),
    ielogNameNotAvailable(8),
    mgmtAddrListNotAvailable(9),
    ieInfoListNotAvailable(10),
    portListNotAvailable(11),
    portTypeNotAvailable(12),
    phyPortNumNotAvailable(13),
    attPortNameListNotAvailable(14),
    portStateNotAvailable(15),
    unableToRegIELogName(16),
    platformNameNoExist(17),
    platformNameAlreadyExists(18),
    platformNodeNameNoExists(19),
    platformNodeNameAlreadyExists(20),
    resourceUnavailable(21),
    noEntriesInLunMap(22),
    invalidDeviceNameLength(23),
    multipleAttributes(24),
    invalidAttribBlockLength(25),
    attributesMissing(26)
}
```

```
--
```

```
-- Objects for Fabric Discovery
```

```
--
```

## t11FcsFabricDiscoveryTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF T11FcsFabricDiscoveryEntry
MAX-ACCESS  not-accessible
STATUS      current
```

Expires July 2007

[Page 17]

## DESCRIPTION

"This table contains control information for discovery of fabric configuration by switches.

Values written to objects in this table are not retained over agent reboots."

::= { t11FcsDiscovery 1 }

## t11FcsFabricDiscoveryEntry OBJECT-TYPE

SYNTAX T11FcsFabricDiscoveryEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Control information for discovery by the switch identified by fcmInstanceIndex and fcmSwitchIndex."

INDEX { fcmInstanceIndex, fcmSwitchIndex }

::= { t11FcsFabricDiscoveryTable 1 }

## T11FcsFabricDiscoveryEntry ::= SEQUENCE {

t11FcsFabricDiscoveryRangeLow T11FabricIndex,

t11FcsFabricDiscoveryRangeHigh T11FabricIndex,

t11FcsFabricDiscoveryStart INTEGER,

t11FcsFabricDiscoveryTimeOut Unsigned32

}

## t11FcsFabricDiscoveryRangeLow OBJECT-TYPE

SYNTAX T11FabricIndex

MAX-ACCESS read-write

STATUS current

## DESCRIPTION

"The discovery by a particular switch operates within all existing Fabrics that have a fabric index within a specific inclusive range. This object specifies the minimum Fabric index value within that range. This value just represents the lower end of the range and does not necessarily represent any existing fabric."

::= { t11FcsFabricDiscoveryEntry 1 }

## t11FcsFabricDiscoveryRangeHigh OBJECT-TYPE

SYNTAX T11FabricIndex

MAX-ACCESS read-write

STATUS current

## DESCRIPTION

"The discovery by a particular switch operates



within all existing fabrics that have a fabric index within a specific inclusive range. This object specifies the maximum fabric index value within that range. This value just represents the higher end of the range and does not necessarily represent any existing fabric."

::= { t11FcsFabricDiscoveryEntry 2 }

t11FcsFabricDiscoveryStart OBJECT-TYPE

SYNTAX INTEGER {  
start(1),  
noOp(2)  
}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object provides the capability to trigger the start of a discovery by a Fabric Configuration Server. If this object is set to 'start', then the discovery is started on those fabrics which have their fabric index value in the range specified by t11FcsFabricDiscoveryRangeLow and t11FcsFabricDiscoveryRangeHigh. It is recommended that whenever an instance of this object is set to 'start', that the desired range be specified at the same time by setting the corresponding instances of t11FcsFabricDiscoveryRangeLow and t11FcsFabricDiscoveryRangeHigh.

Setting this object to 'start' will be rejected if a discovery is already/still in progress on any fabrics in the specified range.

No action is taken if this object is set to 'noOp'.

The value of this object when read is always 'noOp'."

::= { t11FcsFabricDiscoveryEntry 3 }

t11FcsFabricDiscoveryTimeOut OBJECT-TYPE

SYNTAX Unsigned32 (300..86400)

UNITS "Seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The minimum interval of time for which the discovered fabric information is cached by a Fabric Configuration Server."



```
DEFVAL { 900 }
 ::= { t11FcsFabricDiscoveryEntry 4 }
```

```
--
-- Discovery State table
--
```

```
t11FcsDiscoveryStateTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11FcsDiscoveryStateEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the status of discovery of
        locally-known fabrics."
    ::= { t11FcsDiscovery 2 }
```

```
t11FcsDiscoveryStateEntry OBJECT-TYPE
    SYNTAX      T11FcsDiscoveryStateEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The discovery status for a particular fabric on the
        switch identified by fcmInstanceIndex and fcmSwitchIndex."
    INDEX      { fcmInstanceIndex, fcmSwitchIndex, t11FcsFabricIndex }
    ::= { t11FcsDiscoveryStateTable 1 }
```

```
T11FcsDiscoveryStateEntry ::= SEQUENCE {
    t11FcsFabricIndex      T11FabricIndex,
    t11FcsDiscoveryStatus  INTEGER,
    t11FcsDiscoveryCompleteTime  TimeStamp
}
```

```
t11FcsFabricIndex OBJECT-TYPE
    SYNTAX      T11FabricIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A unique index value which uniquely identifies a
        particular fabric.
```

In a fabric conformant to FC-SW-4, multiple Virtual Fabrics can operate within one (or more) physical infrastructures, and this index value is used to uniquely identify a particular (physical or virtual) fabric within a physical infrastructure.



In a fabric conformant to versions earlier than FC-SW-4, only a single fabric could operate within a physical infrastructure, and thus, the value of this fabric index was defined to always be 1."

::= { t11FcsDiscoveryStateEntry 1 }

t11FcsDiscoveryStatus OBJECT-TYPE

SYNTAX INTEGER {  
inProgress(1),  
completed(2),  
localOnly(3)  
}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The status of the discovery for the particular fabric.

Initially when the switch comes up, all instances of this object have the value: 'localOnly', and the database contains only local information, i.e., no information discovered via the Fabric Configuration Server protocol specified in FC-GS-5.

If t11FcsFabricDiscoveryStart is set to 'start' for a range of fabrics which includes this fabric, then the value of this object transitions to 'inProgress'. When the discovery completes, this object transitions to 'completed', and the data is cached for the minimum interval of time specified by t11FcsFabricDiscoveryTimeout. After this interval has been exceeded, the data may be lost, in which case the value of this object changes to 'localOnly'.

This object cannot be set via SNMP to any value other than 'localOnly'. If this object is set (via SNMP) to 'localOnly', the cached data for the fabric is discarded immediately, and if a discovery initiated from this switch was in progress for this fabric, then that discovery is aborted."

::= { t11FcsDiscoveryStateEntry 2 }

t11FcsDiscoveryCompleteTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current



## DESCRIPTION

"This object contains the value of sysUpTime at which discovery was most recently completed or aborted on this fabric. This object contains the value of zero before the first discovery on this fabric."

::= { t11FcsDiscoveryStateEntry 3 }

--

-- The Database of Fabric Configuration Information

--

-- Interconnect Element table

--

## t11FcsIeTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FcsIeEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"A table of Interconnect Elements. Interconnect Elements (IEs) are switches, hubs, bridges etc.

By default, the Fabric Configuration Server will maintain detailed information pertaining only to local resources. As far as discovered topology is concerned, only the IE name, type and domain-id information will be maintained. If a discovery cycle is triggered on a set of fabrics, this table along with the Port and Platform tables will be populated with the discovered information. The discovered data will be retained in this table for at least t11FcsFabricDiscoveryTimeOut seconds after the completion of its discovery or till the discovered data is invalidated."

::= { t11FcsDiscoveredConfig 1 }

## t11FcsIeEntry OBJECT-TYPE

SYNTAX T11FcsIeEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Information about an Interconnect Element which was discovered on a fabric (identified by t11FcsFabricIndex), by a switch (identified by fcmInstanceIndex and



fcmSwitchIndex)."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.2](#)."

INDEX { fcmInstanceIndex, fcmSwitchIndex, t11FcsFabricIndex,  
t11FcsIeName }  
::= { t11FcsIeTable 1 }

T11FcsIeEntry ::= SEQUENCE {

t11FcsIeName	FcNameIdOrZero,
t11FcsIeType	T11FcIeType,
t11FcsIeDomainId	FcDomainIdOrZero,
t11FcsIeMgmtId	FcAddressIdOrZero,
t11FcsIeFabricName	FcNameIdOrZero,
t11FcsIeLogicalName	OCTET STRING,
t11FcsIeMgmtAddrListIndex	T11FcListIndexPointerOrZero,
t11FcsIeInfoList	OCTET STRING

}

t11FcsIeName OBJECT-TYPE

SYNTAX FcNameIdOrZero (SIZE(8 | 16))

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"The WWN of an Interconnect Element. This object uniquely identifies an Interconnect Element on a fabric. If the IE is a switch, then this object is the Switch\_Name (WWN) of the switch."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.2.1](#)."

::= { t11FcsIeEntry 1 }

t11FcsIeType OBJECT-TYPE

SYNTAX T11FcIeType

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The type of this Interconnect Element."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.2.2](#)"

::= { t11FcsIeEntry 2 }

t11FcsIeDomainId OBJECT-TYPE



SYNTAX FcDomainIdOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Domain Id of this Interconnect Element."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.2.3](#)."

::= { t11FcsIeEntry 3 }

t11FcsIeMgmtId OBJECT-TYPE

SYNTAX FcAddressIdOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The management identifier of this Interconnect Element.  
If the Interconnect Element is a switch, this object will  
be the Domain Controller identifier of the switch. When  
the value of the identifier is unknown, this object  
contains the all-zeros value: x'00 00 00'."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.2.4](#)."

DEFVAL { '000000'h }

::= { t11FcsIeEntry 4 }

t11FcsIeFabricName OBJECT-TYPE

SYNTAX FcNameIdOrZero (SIZE(8 | 16))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Fabric\_Name (WWN) of this Interconnect Element.  
When the Fabric\_Name is unknown, this object contains  
the all-zeros value: x'00 00 00 00 00 00 00 00'."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.2.5](#)."

DEFVAL { '0000000000000000'h }

::= { t11FcsIeEntry 5 }

t11FcsIeLogicalName OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0..255))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

Expires July 2007

[Page 24]

"The logical name of this Interconnect Element.  
When the logical name is unknown, this object contains  
the zero-length string."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.2.6](#)."

::= { t11FcsIeEntry 6 }

t11FcsIeMgmtAddrListIndex OBJECT-TYPE

SYNTAX T11FcListIndexPointerOrZero

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The management address list for this Interconnect Element.  
This object points to an entry in the  
t11FcsMgmtAddrListTable."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.2.7](#)."

::= { t11FcsIeEntry 7 }

t11FcsIeInfoList OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0..252))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The information list for this Interconnect Element.

The value of this object is formatted as specified in  
FC-GS-5, i.e., it has the following substrings in order:  
vendor name, model name/number and release code/level,  
followed by zero or more substrings of vendor-specific  
information. Each substring is terminated with a byte  
containing a null value (x'00')."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.2.8](#)"

::= { t11FcsIeEntry 8 }

--

-- Management Address List table

--

t11FcsMgmtAddrListTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FcsMgmtAddrListEntry



MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains the set of management address lists which are currently referenced by any instance of the t11FcsIeMgmtAddrListIndex or t11FcsPlatformMgmtAddrListIndex objects."

::= { t11FcsDiscoveredConfig 2 }

t11FcsMgmtAddrListEntry OBJECT-TYPE

SYNTAX T11FcsMgmtAddrListEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about one management address in a management address list, which is known to a switch (identified by fcmInstanceIndex and fcmSwitchIndex)."

INDEX { fcmInstanceIndex, fcmSwitchIndex,  
t11FcsMgmtAddrListIndex, t11FcsMgmtAddrIndex }

::= { t11FcsMgmtAddrListTable 1 }

T11FcsMgmtAddrListEntry ::= SEQUENCE {

t11FcsMgmtAddrListIndex T11FcListIndex,

t11FcsMgmtAddrIndex Unsigned32,

t11FcsMgmtAddr URLString

}

t11FcsMgmtAddrListIndex OBJECT-TYPE

SYNTAX T11FcListIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index value of the management address list."

::= { t11FcsMgmtAddrListEntry 1 }

t11FcsMgmtAddrIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An integer value to distinguish different management addresses in the same list."

::= { t11FcsMgmtAddrListEntry 2 }



```

t11FcsMgmtAddr OBJECT-TYPE
    SYNTAX      URLString
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The management address of this entry.

        The format of this object is a Uniform Resource
        Locator (URL), e.g., for SNMP, see RFC 4088."
    REFERENCE
        "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,
        FC-GS-5, section 6.2.3.2.7"
    ::= { t11FcsMgmtAddrListEntry 3 }

--
-- Ports
--

t11FcsPortTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11FcsPortEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table contains information about the ports of IEs."
    ::= { t11FcsDiscoveredConfig 4 }

t11FcsPortEntry OBJECT-TYPE
    SYNTAX      T11FcsPortEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "Information about a particular port of an Interconnect
        Element (identified by t11FcsIeName). The port is
        connected to a fabric (identified by t11FcsFabricIndex)
        and known to a switch (identified by fcmInstanceIndex
        and fcmSwitchIndex)."
```

INDEX { fcmInstanceIndex, fcmSwitchIndex, t11FcsFabricIndex,  
t11FcsIeName, t11FcsPortName }

```

    ::= { t11FcsPortTable 1 }

T11FcsPortEntry ::= SEQUENCE {
    t11FcsPortName          FcNameIdOrZero,
    t11FcsPortType          FcPortType,
    t11FcsPortTxType        T11FcPortTxType,
    t11FcsPortModuleType    Unsigned32,
```



```
t11FcsPortPhyPortNum      Unsigned32,
t11FcsPortAttachPortNameIndex  T11FcListIndexPointerOrZero,
t11FcsPortState            T11FcPortState,
t11FcsPortSpeedCapab       OCTET STRING,
t11FcsPortOperSpeed        OCTET STRING,
t11FcsPortZoningEnfStatus   OCTET STRING
}

t11FcsPortName  OBJECT-TYPE
    SYNTAX      FcNameIdOrZero (SIZE(8 | 16))
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "The Port_Name (WWN) of the port for which this row
        contains information."
    REFERENCE
        "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,
        FC-GS-5, section 6.2.3.3.1."
    ::= { t11FcsPortEntry 1 }

t11FcsPortType  OBJECT-TYPE
    SYNTAX      FcPortType
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The Port Type of this port."
    REFERENCE
        "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,
        FC-GS-5, section 6.2.3.3.2."
    ::= { t11FcsPortEntry 2 }

t11FcsPortTxType  OBJECT-TYPE
    SYNTAX      T11FcPortTxType
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The Port TX Type of this port."
    REFERENCE
        "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,
        FC-GS-5, section 6.2.3.3.3."
    ::= { t11FcsPortEntry 3 }

t11FcsPortModuleType  OBJECT-TYPE
    SYNTAX      Unsigned32 (0..255)
    MAX-ACCESS   read-only
```



STATUS current

DESCRIPTION

"The port module type of this port."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.3.4](#)."

::= { t11FcsPortEntry 4 }

t11FcsPortPhyPortNum OBJECT-TYPE

SYNTAX Unsigned32 -- the default range of (0..4294967295)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The physical number for this port. FC-GS-5 says that  
the contents of this field, which are carried in a field  
with a size of 4-bytes, are not to be restricted due to  
vendor specific methods for numbering physical ports."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.3.5](#)."

::= { t11FcsPortEntry 5 }

t11FcsPortAttachPortNameIndex OBJECT-TYPE

SYNTAX T11FcListIndexPointerOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The attached port name list for this port. This object  
points to an entry in the t11FcsAttachPortNameListTable."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.3.6](#)."

::= { t11FcsPortEntry 6 }

t11FcsPortState OBJECT-TYPE

SYNTAX T11FcPortState

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The state of this port."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.3.7](#)."

::= { t11FcsPortEntry 7 }



**t11FcsPortSpeedCapab OBJECT-TYPE**

SYNTAX OCTET STRING (SIZE (2))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The port speed capabilities of this port. The two octets of the value are formatted as described in FC-GS-5."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.3.8](#)."

::= { t11FcsPortEntry 8 }

**t11FcsPortOperSpeed OBJECT-TYPE**

SYNTAX OCTET STRING (SIZE (2))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The operating speed of this port. The two octets of the value are formatted as described in FC-GS-5."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.3.9](#)."

::= { t11FcsPortEntry 9 }

**t11FcsPortZoningEnfStatus OBJECT-TYPE**

SYNTAX OCTET STRING (SIZE (12))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The zoning enforcement status of this port.. The twelve octets of the value are formatted as described in FC-GS-5."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.3.10](#)."

::= { t11FcsPortEntry 10 }

--

-- Attached Port List table

--

**t11FcsAttachPortNameListTable OBJECT-TYPE**

SYNTAX SEQUENCE OF T11FcsAttachPortNameListEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION



"This table contains all the lists of attach port names."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.3.6](#)"

::= { t11FcsDiscoveredConfig 5 }

## t11FcsAttachPortNameListEntry OBJECT-TYPE

SYNTAX T11FcsAttachPortNameListEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Information about the name of a particular attached port, which is known to a switch (identified by fcmInstanceIndex and fcmSwitchIndex)."

INDEX { fcmInstanceIndex, fcmSwitchIndex,  
t11FcsAttachPortNameListIndex, t11FcsAttachPortName }

::= { t11FcsAttachPortNameListTable 1 }

## T11FcsAttachPortNameListEntry ::= SEQUENCE {

t11FcsAttachPortNameListIndex T11FcListIndex,

t11FcsAttachPortName OCTET STRING

}

## t11FcsAttachPortNameListIndex OBJECT-TYPE

SYNTAX T11FcListIndex

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"The index value of the attach port name list."

::= { t11FcsAttachPortNameListEntry 1 }

## t11FcsAttachPortName OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (12))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The attached port name. Zero or more of these names may be associated with a port object.

The first 8 bytes of this object contain the WWN of the port followed by 2 reserved bytes. Following this is one byte of Port flags and one byte of Port type, as described in FC-GS-5."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,



FC-GS-5, [section 6.2.3.3.6](#)"  
 ::= { t11FcsAttachPortNameListEntry 2 }

--  
-- Platforms  
--

t11FcsPlatformTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FcsPlatformEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains information on platforms.

By default, this table only contains local (e.g., for a local switch) information. If a discovery is triggered, this table will also contain information gathered by the discovery process. The discovered information is retained in this table for at least t11FcsFabricDiscoveryTimeOut seconds after the completion of its discovery or until the discovered cache is invalidated."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.4](#)"

::= { t11FcsDiscoveredConfig 6 }

t11FcsPlatformEntry OBJECT-TYPE

SYNTAX T11FcsPlatformEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a particular platform, which is known to a switch (identified by fcmInstanceIndex and fcmSwitchIndex).

A platform can contain multiple nodes. Information on nodes is contained in the t11FcsNodeNameListTable. The t11FcsPlatformNodeNameListIndex object in this table points to the list of nodes contained in this platform. Similarly, the t11FcsPlatformMgmtAddrListIndex object in this table points to the list of management addresses associated with this platform."

INDEX { fcmInstanceIndex, fcmSwitchIndex,  
t11FcsFabricIndex, t11FcsPlatformIndex }

::= { t11FcsPlatformTable 1 }



```
T11FcsPlatformEntry ::= SEQUENCE {
    t11FcsPlatformIndex      Unsigned32,
    t11FcsPlatformName       OCTET STRING,
    t11FcsPlatformType       OCTET STRING,
    t11FcsPlatformNodeNameListIndex T11FcListIndexPointerOrZero,
    t11FcsPlatformMgmtAddrListIndex T11FcListIndexPointerOrZero,
    t11FcsPlatformVendorId    SnmpAdminString,
    t11FcsPlatformProductId   SnmpAdminString,
    t11FcsPlatformProductRevLevel SnmpAdminString,
    t11FcsPlatformDescription SnmpAdminString,
    t11FcsPlatformLabel       SnmpAdminString,
    t11FcsPlatformLocation    SnmpAdminString,
    t11FcsPlatformSystemID    SnmpAdminString,
    t11FcsPlatformSysMgmtAddr  T11FcListIndexPointerOrZero,
    t11FcsPlatformClusterId    SnmpAdminString,
    t11FcsPlatformClusterMgmtAddr T11FcListIndexPointerOrZero,
    t11FcsPlatformFC4Types     OCTET STRING
}
```

t11FcsPlatformIndex OBJECT-TYPE

```
SYNTAX      Unsigned32 (1..4294967295)
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION
    "An integer value to distinguish one platform from
    other platforms in the same fabric."
 ::= { t11FcsPlatformEntry 1 }
```

t11FcsPlatformName OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (1..255))
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
    "The name of this platform. The last byte of the value
    indicates the format of the name (even if the name itself
    is the zero-length string) as specified in FC-GS-5."
REFERENCE
    "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,
    FC-GS-5, section 6.2.3.4.2"
 ::= { t11FcsPlatformEntry 2 }
```

t11FcsPlatformType OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (4))
MAX-ACCESS   read-only
STATUS       current
```

Expires July 2007

[Page 33]

## DESCRIPTION

"The type(s) of this platform, encoded in four bytes as specified in FC-GS-5."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.4.3](#)"

::= { t11FcsPlatformEntry 3 }

## t11FcsPlatformNodeNameListIndex OBJECT-TYPE

SYNTAX T11FcListIndexPointerOrZero

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The list of nodes for this platform. This object points to an entry in the t11FcsNodeNameListTable."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.4.6](#)"

::= { t11FcsPlatformEntry 4 }

## t11FcsPlatformMgmtAddrListIndex OBJECT-TYPE

SYNTAX T11FcListIndexPointerOrZero

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The list of management addresses for this platform. This object points to an entry in the t11FcsMgmtAddrListTable."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.4.7](#)"

::= { t11FcsPlatformEntry 5 }

## t11FcsPlatformVendorId OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0 | 12))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The identifier of the vendor of this platform, in the format specified in FC-GS-5."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.4.5](#)"

::= { t11FcsPlatformEntry 6 }

## t11FcsPlatformProductId OBJECT-TYPE



SYNTAX            SnmpAdminString (SIZE (0 | 20))  
MAX-ACCESS       read-only  
STATUS            current  
DESCRIPTION  
                  "The vendor's product and/or model identifier for this  
                  platform, in the format specified in FC-GS-5."  
REFERENCE  
                  "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
                  FC-GS-5, [section 6.2.3.4.5](#)"  
::= { t11FcsPlatformEntry 7 }

t11FcsPlatformProductRevLevel OBJECT-TYPE  
SYNTAX            SnmpAdminString (SIZE (0 | 4..32))  
MAX-ACCESS       read-only  
STATUS            current  
DESCRIPTION  
                  "The product revision level for this platform, in the  
                  format specified in FC-GS-5."  
REFERENCE  
                  "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
                  FC-GS-5, [section 6.2.3.4.5](#)"  
::= { t11FcsPlatformEntry 8 }

t11FcsPlatformDescription OBJECT-TYPE  
SYNTAX            SnmpAdminString (SIZE (0 | 4..128))  
MAX-ACCESS       read-only  
STATUS            current  
DESCRIPTION  
                  "The description of this platform, in the  
                  format specified in FC-GS-5. This value should  
                  include the full name and version identification of the  
                  platform's hardware type and software operating system."  
REFERENCE  
                  "ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
                  FC-GS-5, [section 6.2.3.4.10](#)"  
::= { t11FcsPlatformEntry 9 }

t11FcsPlatformLabel OBJECT-TYPE  
SYNTAX            SnmpAdminString (SIZE (0 | 4..64))  
MAX-ACCESS       read-only  
STATUS            current  
DESCRIPTION  
                  "An administratively assigned symbolic name for the  
                  platform, in the format specified in FC-GS-5."  
REFERENCE

Expires July 2007

[Page 35]

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.4.11](#)"  
::= { t11FcsPlatformEntry 10 }

t11FcsPlatformLocation OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0 | 4..128))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The physical location of the platform, in the format  
specified in FC-GS-5 (e.g., 'telephone closet, 3rd floor')."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.4.12](#)"

::= { t11FcsPlatformEntry 11 }

t11FcsPlatformSystemID OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0 | 4..64))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"An identifier for a hosting system that this platform is  
associated with. This identifier is used to associate  
platforms of logical types (e.g., logical partitions) with  
a physical system."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, [section 6.2.3.4.5](#)"

::= { t11FcsPlatformEntry 12 }

t11FcsPlatformSysMgmtAddr OBJECT-TYPE

SYNTAX T11FcListIndexPointerOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A list of management addresses for the platform."

REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5,  
FC-GS-5, sections [6.2.3.4.5](#) and [6.2.3.2.7](#)."

::= { t11FcsPlatformEntry 13 }

t11FcsPlatformClusterId OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0 | 4..64))

MAX-ACCESS read-only

STATUS current



## DESCRIPTION

"An identifier for a cluster that this platform is associated with, where a cluster is a set of independent platforms that are managed together to provide increased performance capabilities, failover, etc."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.4.5](#)"

::= { t11FcsPlatformEntry 14 }

## t11FcsPlatformClusterMgmtAddr OBJECT-TYPE

SYNTAX T11FcListIndexPointerOrZero

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"A list of management addresses for the cluster identified in the corresponding instance of t11FcsPlatformClusterId."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, sections [6.2.3.4.5](#) and [6.2.3.2.7](#)."

::= { t11FcsPlatformEntry 15 }

## t11FcsPlatformFC4Types OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0 | 32))

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The FC-4 types supported by this platform, formatted as a bit mask as specified in FC-GS-5. If this object contains the zero-length string, the types are unknown."

## REFERENCE

"ANSI INCITS 427-2006, Fibre Channel - Generic Services 5, FC-GS-5, [section 6.2.3.4.5](#)"

::= { t11FcsPlatformEntry 16 }

--

-- Node Name List table

--

## t11FcsNodeNameListTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FcsNodeNameListEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table contains all the lists of nodes."



```
::= { t11FcsDiscoveredConfig 7 }
```

```
t11FcsNodeNameListEntry OBJECT-TYPE
```

```
SYNTAX T11FcsNodeNameListEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"Information about a node, which is known to a  
switch (identified by fcmInstanceIndex and  
fcmSwitchIndex)."
```

```
INDEX { fcmInstanceIndex, fcmSwitchIndex,  
t11FcsNodeNameListIndex, t11FcsNodeName }
```

```
::= { t11FcsNodeNameListTable 1 }
```

```
T11FcsNodeNameListEntry ::= SEQUENCE {
```

```
t11FcsNodeNameListIndex T11FcListIndex,
```

```
t11FcsNodeName FcNameIdOrZero
```

```
}
```

```
t11FcsNodeNameListIndex OBJECT-TYPE
```

```
SYNTAX T11FcListIndex
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"The index value of the node name list."
```

```
::= { t11FcsNodeNameListEntry 1 }
```

```
t11FcsNodeName OBJECT-TYPE
```

```
SYNTAX FcNameIdOrZero (SIZE(8 | 16))
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION
```

```
"The name of this node."
```

```
::= { t11FcsNodeNameListEntry 2 }
```

```
--
```

```
-- Statistics
```

```
--
```

```
t11FcsStatsTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF T11FcsStatsEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This table contains all the statistics related
```



to the Fabric Configuration Server."  
 ::= { t11FcsStats 1 }

t11FcsStatsEntry OBJECT-TYPE  
SYNTAX T11FcsStatsEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"A set of statistics for a particular fabric (identified  
by t11FcsFabricIndex) on a switch (identified by  
fcmInstanceIndex and fcmSwitchIndex)."  
INDEX { fcmInstanceIndex, fcmSwitchIndex, t11FcsFabricIndex }  
 ::= { t11FcsStatsTable 1 }

T11FcsStatsEntry ::= SEQUENCE {  
t11FcsInGetReqs Counter32,  
t11FcsOutGetReqs Counter32,  
t11FcsInRegReqs Counter32,  
t11FcsOutRegReqs Counter32,  
t11FcsInDeregReqs Counter32,  
t11FcsOutDeregReqs Counter32,  
t11FcsRejects Counter32  
}

t11FcsInGetReqs OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of Get Requests received by the Fabric  
Configuration Server on this fabric.  
  
This counter has no discontinuities other than  
those that all Counter32s have when sysUpTime=0."  
 ::= { t11FcsStatsEntry 1 }

t11FcsOutGetReqs OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"The number of Get Requests sent by the Fabric  
Configuration Server on this fabric to other  
servers in the fabric."



This counter has no discontinuities other than those that all Counter32s have when sysUpTime=0."  
 ::= { t11FcsStatsEntry 2 }

t11FcsInRegReqs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Registration Requests received by the Fabric Configuration Server on this fabric.

This counter has no discontinuities other than those that all Counter32s have when sysUpTime=0."  
 ::= { t11FcsStatsEntry 3 }

t11FcsOutRegReqs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Registration Requests sent by the Fabric Configuration Server on this fabric.

This counter has no discontinuities other than those that all Counter32s have when sysUpTime=0."  
 ::= { t11FcsStatsEntry 4 }

t11FcsInDeregReqs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Deregistration Requests received by the Fabric Configuration Server on this fabric.

This counter has no discontinuities other than those that all Counter32s have when sysUpTime=0."  
 ::= { t11FcsStatsEntry 5 }

t11FcsOutDeregReqs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only



STATUS current

DESCRIPTION

"The number of Deregistration Requests sent by the Fabric Configuration Server on this fabric.

This counter has no discontinuities other than those that all Counter32s have when sysUpTime=0."

::= { t11FcsStatsEntry 6 }

t11FcsRejects OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of requests rejected by the Fabric Configuration Server on this fabric.

This counter has no discontinuities other than those that all Counter32s have when sysUpTime=0."

::= { t11FcsStatsEntry 7 }

--

-- Notification Control Table

--

t11FcsNotifyControlTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FcsNotifyControlEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of control information for notifications generated due to Fabric Configuration Server events.

Values written to objects in this table should be persistent/retained over agent reboots."

::= { t11FcsNotificationInfo 1 }

t11FcsNotifyControlEntry OBJECT-TYPE

SYNTAX T11FcsNotifyControlEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry contains notification control information for a Fabric Configuration Server on a particular fabric (identified by t11FcsFabricIndex) on a particular



```
switch (identified by fcmInstanceIndex and
fcmSwitchIndex)."
```

```
INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11FcsFabricIndex }
```

```
::= { t11FcsNotifyControlTable 1 }
```

```
T11FcsNotifyControlEntry ::= SEQUENCE {
    t11FcsReqRejectNotifyEnable      TruthValue,
    t11FcsDiscoveryCompNotifyEnable  TruthValue,
    t11FcsMgmtAddrChangeNotifyEnable TruthValue,
    t11FcsRejectCtCommandString      OCTET STRING,
    t11FcsRejectRequestSource        FcNameIdOrZero,
    t11FcsRejectReasonCode           T11NsGs4RejectReasonCode,
    t11FcsRejectReasonCodeExp        T11FcsRejectReasonExplanation,
    t11FcsRejectReasonVendorCode     OCTET STRING
}
```

t11FcsReqRejectNotifyEnable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object specifies if the Fabric Configuration Server should generate 't11FcsRqRejectNotification' notifications.

If the value of this object is 'true', then the notification is issued. If the value of this object is 'false', then the notification is not issued."

DEFVAL { false }

```
::= { t11FcsNotifyControlEntry 1 }
```

t11FcsDiscoveryCompNotifyEnable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object specifies if the Fabric Configuration Server should generate 't11FcsDiscoveryCompleteNotify' notifications.

If the value of this object is 'true', then the notification is issued. If the value of this object is 'false', then the notification is not issued."

DEFVAL { false }



```
::= { t11FcsNotifyControlEntry 2 }
```

t11FcsMgmtAddrChangeNotifyEnable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object specifies if the Fabric Configuration Server should generate 't11FcsMgmtAddrChangeNotify' notifications.

If the value of this object is 'true', then the notification is issued. If the value of this object is 'false', then the notification is not issued."

DEFVAL { false }

```
::= { t11FcsNotifyControlEntry 3 }
```

t11FcsRejectCtCommandString OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0..255))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The binary content of the Fabric Configuration Server request, formatted as an octet string (in network byte order) containing the CT\_IU, as described in Table 2 of FC-GS-5 (including the preamble), which was most recently rejected by the Fabric Configuration Server for this fabric.

This object contains the zero-length string if and when the CT-IU's content is unavailable.

When the length of this object is 255 octets, it contains the first 255 octets of the CT-IU (in network-byte order)."

```
::= { t11FcsNotifyControlEntry 4 }
```

t11FcsRejectRequestSource OBJECT-TYPE

SYNTAX FcNameIdOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The WWN which was the source of the CT\_IU contained in the corresponding instance of t11FcsRejectCtCommandString."

```
::= { t11FcsNotifyControlEntry 5 }
```

t11FcsRejectReasonCode OBJECT-TYPE



SYNTAX T11NsGs4RejectReasonCode

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object contains the reason code corresponding to the latest Fabric Configuration Server request rejected by the local system."

::= { t11FcsNotifyControlEntry 6 }

t11FcsRejectReasonCodeExp OBJECT-TYPE

SYNTAX T11FcsRejectReasonExplanation

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When the corresponding instance of t11FcsRejectReasonCode has the value: 'unable to perform command request', this object contains the corresponding reason code explanation."

::= { t11FcsNotifyControlEntry 7 }

t11FcsRejectReasonVendorCode OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(1))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A registration reject vendor-specific code. This object contains the vendor-specific code of the most recently rejected Fabric Configuration Server Registration request for the particular port on the particular fabric."

::= { t11FcsNotifyControlEntry 8 }

--

-- Notifications

--

t11FcsRqRejectNotification NOTIFICATION-TYPE

OBJECTS { t11FamLocalSwitchWwn,  
t11FcsRejectReasonCode,  
t11FcsRejectReasonCodeExp,  
t11FcsRejectReasonVendorCode }

STATUS current

DESCRIPTION

"This notification is generated whenever the Fabric Configuration Server on a switch (indicated by the value of t11FamLocalSwitchWwn) rejects a Fabric

Expires July 2007

[Page 44]

Configuration Server request.

The Fabric Configuration Server should update the t11FcsRejectReasonCode, t11FcsRejectReasonCodeExp and t11FcsRejectReasonVendorCode objects with the corresponding reason code, explanation and vendor specific code before sending the notification."

::= { t11FcsNotifications 1 }

t11FcsDiscoveryCompleteNotify NOTIFICATION-TYPE

OBJECTS {t11FcsFabricDiscoveryRangeLow}

STATUS current

DESCRIPTION

"This notification is generated by the Fabric Configuration Server on the completion of the discovery of fabrics in the range which has t11FcsFabricDiscoveryRangeLow at its low end."

::= { t11FcsNotifications 2 }

t11FcsMgmtAddrChangeNotify NOTIFICATION-TYPE

OBJECTS { t11FcsMgmtAddrChangeFabricIndex,  
t11FcsMgmtAddrChangeIeName }

STATUS current

DESCRIPTION

"This notification is generated by the Fabric Configuration Server whenever the management address of an IE changes, i.e., whenever an entry in the t11FcsMgmtAddrListTable changes."

::= { t11FcsNotifications 3 }

t11FcsMgmtAddrChangeFabricIndex OBJECT-TYPE

SYNTAX T11FabricIndex

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"The index value which identifies the fabric on which a management address change has been detected."

::= { t11FcsNotificationInfo 2 }

t11FcsMgmtAddrChangeIeName OBJECT-TYPE

SYNTAX FcNameIdOrZero

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"The IE for which a management address change has been



```
        detected."
 ::= { t11FcsNotificationInfo 3 }

-- Conformance

t11FcsMIBCompliances OBJECT IDENTIFIER ::= { t11FcsMIBConformance 1 }
t11FcsMIBGroups       OBJECT IDENTIFIER ::= { t11FcsMIBConformance 2 }

t11FcsMIBCompliance MODULE-COMPLIANCE
    STATUS          current
    DESCRIPTION
        "The compliance statement for entities which
        implement the Fabric Configuration Server."
    MODULE MANDATORY-GROUPS { t11FcsDiscoveredConfigGroup,
                               t11FcsDiscoveryStatusGroup,
                               t11FcsNotificationInfoGroup,
                               t11FcsNotificationGroup }

    GROUP t11FcsDiscoveryControlGroup
    DESCRIPTION
        "This group is mandatory only for those systems which
        allow discovery of configuration by Fabric Configuration
        Servers to be controlled via a MIB."

    GROUP t11FcsStatisticsGroup
    DESCRIPTION
        "These counters, containing Fabric Configuration
        Server statistics, are mandatory only for those systems
        which count such events."

    OBJECT t11FcsDiscoveryStatus
    WRITE-SYNTAX INTEGER { localOnly(3) }
    MIN-ACCESS read-only
    DESCRIPTION
        "Write access is not required.
        However, if write access is supported, then the only
        writable value is 'localOnly'."

    OBJECT t11FcsReqRejectNotifyEnable
    MIN-ACCESS read-only
    DESCRIPTION
        "Write access is not required."

    OBJECT t11FcsDiscoveryCompNotifyEnable
```



MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT t11FcsMgmtAddrChangeNotifyEnable

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

::= { t11FcsMIBCompliances 1 }

-- Units of Conformance

t11FcsDiscoveryControlGroup OBJECT-GROUP

OBJECTS { t11FcsFabricDiscoveryRangeLow,  
t11FcsFabricDiscoveryRangeHigh,  
t11FcsFabricDiscoveryStart,  
t11FcsFabricDiscoveryTimeOut }

STATUS current

DESCRIPTION

"A collection of objects for requesting a Fabric  
Configuration Server to discover the configuration  
of one or more fabrics."

::= { t11FcsMIBGroups 1 }

t11FcsDiscoveryStatusGroup OBJECT-GROUP

OBJECTS { t11FcsDiscoveryStatus,  
t11FcsDiscoveryCompleteTime }

STATUS current

DESCRIPTION

"A collection of objects with which to monitor the  
status of discovery (of fabric configurations) by  
Fabric Configuration Servers."

::= { t11FcsMIBGroups 2 }

t11FcsDiscoveredConfigGroup OBJECT-GROUP

OBJECTS {  
t11FcsIeType,  
t11FcsIeDomainId,  
t11FcsIeMgmtId,  
t11FcsIeFabricName,  
t11FcsIeLogicalName,  
t11FcsIeMgmtAddrListIndex,  
t11FcsIeInfoList,



```
t11FcsMgmtAddr,  
t11FcsPortType,  
t11FcsPortTxType,  
t11FcsPortModuleType,  
t11FcsPortPhyPortNum,  
t11FcsPortAttachPortNameIndex,  
t11FcsPortState,  
t11FcsPortSpeedCapab,  
t11FcsPortOperSpeed,  
t11FcsPortZoningEnfStatus,  
t11FcsAttachPortName,  
t11FcsPlatformName,  
t11FcsPlatformType,  
t11FcsPlatformNodeNameListIndex,  
t11FcsPlatformMgmtAddrListIndex,  
t11FcsPlatformVendorId,  
t11FcsPlatformProductId,  
t11FcsPlatformProductRevLevel,  
t11FcsPlatformDescription,  
t11FcsPlatformLabel,  
t11FcsPlatformLocation,  
t11FcsPlatformSystemID,  
t11FcsPlatformSysMgmtAddr,  
t11FcsPlatformClusterId,  
t11FcsPlatformClusterMgmtAddr,  
t11FcsPlatformFC4Types,  
t11FcsNodeName }
```

STATUS current

DESCRIPTION

"A collection of objects to contain the fabric configuration  
information discovered by Fabric Configuration Servers."

::= { t11FcsMIBGroups 3 }

t11FcsStatisticsGroup OBJECT-GROUP

```
OBJECTS { t11FcsInGetReqs,  
          t11FcsOutGetReqs,  
          t11FcsInRegReqs,  
          t11FcsOutRegReqs,  
          t11FcsInDeregReqs,  
          t11FcsOutDeregReqs,  
          t11FcsRejects }
```

STATUS current

DESCRIPTION

"A collection of objects for Fabric Configuration Server  
statistics information."

Expires July 2007

[Page 48]

```
::= { t11FcsMIBGroups 4 }
```

```
t11FcsNotificationInfoGroup OBJECT-GROUP
```

```
OBJECTS { t11FcsReqRejectNotifyEnable,  
          t11FcsDiscoveryCompNotifyEnable,  
          t11FcsMgmtAddrChangeNotifyEnable,  
          t11FcsRejectCtCommandString,  
          t11FcsRejectRequestSource,  
          t11FcsRejectReasonCode,  
          t11FcsRejectReasonCodeExp,  
          t11FcsRejectReasonVendorCode,  
          t11FcsMgmtAddrChangeFabricIndex,  
          t11FcsMgmtAddrChangeIeName }
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A collection of notification control and notification  
information objects for monitoring Fabric  
Configuration Servers."
```

```
::= { t11FcsMIBGroups 5 }
```

```
t11FcsNotificationGroup NOTIFICATION-GROUP
```

```
NOTIFICATIONS { t11FcsRqRejectNotification,  
                t11FcsDiscoveryCompleteNotify,  
                t11FcsMgmtAddrChangeNotify }
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A collection of notifications for monitoring Fabric  
Configuration Servers."
```

```
::= { t11FcsMIBGroups 6 }
```

```
END
```

## **7. Acknowledgements**

This document was originally developed and approved by the INCITS Task Group T11.5 (<http://www.t11.org>) as the SM-FCFGM project. We wish to acknowledge the many contributions and comments from the INCITS Technical Committee T11, including the following:

T11 Chair: Robert Snively, Brocade  
T11 Vice Chair: Claudio DeSanti, Cisco Systems  
T11.5 Chair: Roger Cummings, Symantec  
T11.5 Vice Chair: Scott Kipp, McData  
and T11.5 members.



The document was subsequently a work item of the IETF's IMSS Working Group, chaired by David Black (EMC Corporation). We thank Bert Wijnen (Lucent Technologies) for his thorough review of the document. We also wish to acknowledge Dan Romascanu (Avaya), the IETF Area Director, for his comments and assistance.

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## [SCSI-MIB]

Hallak-Stamler, M., Bakke, M., Lederman, Y., Krueger, M., and K. McCloghrie, "Definition of Managed Objects for SCSI Entities", Internet-Draft ([draft-ietf-ips-scsi-mib-nn.txt](#)), work-in-progress.



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## **11. IANA Considerations**

IANA is requested to make a MIB OID assignment under the appropriate subtree.

## **12. Security Considerations**

There are several management objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations. These objects and their sensitivity/vulnerability is:

t11FcsFabricDiscoveryRangeLow  
t11FcsFabricDiscoveryRangeHigh  
t11FcsFabricDiscoveryTimeOut



```
t11FcsFabricDiscoveryStart -- the ability to specify parameters
                             for, and trigger the start of,
                             a topology discovery
t11FcsDiscoveryStatus      -- the ability to abort a discovery, or
                             invalidate discovered information.
t11FcsReqRejectNotifyEnable
t11FcsDiscoveryCompNotifyEnable
t11FcsMgmtAddrChangeNotifyEnable -- the ability to enable/disable
                                   notifications.
```

Such objects may be considered sensitive or vulnerable in some network environments. For example, the ability to invalidate discovered topology may afford an attacker the ability to hide the presence of unauthorized equipment on the network. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

```
t11FcsIeTable
t11FcsMgmtAddrListTable
t11FcsPortTable
t11FcsAttachPortNameListTable
t11FcsPlatformTable
t11FcsNodeNameListTable -- contains information about the topology
                           of the Fibre Channel network.

t11FcsStatsTable -- contains statistics information about the
                   operation of the Fabric Configuration Server.
```

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementors consider the security features as provided by the SNMPv3 framework (see [\[RFC3410\]](#), [section 8](#)), including full support for the SNMPv3 cryptographic mechanisms (for



authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

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#### Acknowledgment

Funding for the RFC Editor function is currently provided by the Internet Society.