

Internet Draft

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**Fibre-Channel Fabric Configuration Server MIB
06-197v0.txt & draft-kzm-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. At present, this memo is a work item of T11.5 (<http://www.t11.org>). The plan is that it will later be a work item of the IETF's IMSS working group.

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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.

At present, this memo is a work item of T11.5 (<http://www.t11.org>). The plan is that it will later be a work item of the IETF's IMSS working group.

1.1. Change Log

This section to be deleted when the document becomes approved.

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 `t11FcsReqRejectNotify` notification.
- Added URLs for the T11 specifications in the Reference section.
- Several editorial changes.

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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.

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 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

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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 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].

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 [FC-MGMT] 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 [FC-MGMT] 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 [FC-FAM-MIB], and from T11-FC-NAME-SERVER-MIB [FC-NS-MIB].

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 [FC-MGMT] 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

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instance.

The object, `fcmInstanceIndex`, is IMPORTed from the FC-MGMT-MIB [[FC-MGMT](#)] as the index value to uniquely identify each Fibre Channel management instance within the same SNMP context ([\[RFC3411\]](#) [section 3.3.1](#)).

5.2. Switch Index

The FC-MGMT-MIB [[FC-MGMT](#)] 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

[[FC-SW-4](#)] is the latest specification for an interconnecting Fabric consisting of multiple Fabric Switch elements. It describes the operation of one or more Fabrics within one (or more) physical infrastructures. 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.

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

In a fabric conformant to FC switch standards prior to [FC-SW-4](#), only a single fabric could operate within a physical infrastructure, and for such cases, the Fabric index is defined to always be 1.

5.4. The MIB Groups

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

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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."

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.

5.4.6. 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]  
SnmpAdminString  
    FROM SNMP-FRAMEWORK-MIB -- [RFC3411]  
FcPortType, FcNameIdOrZero, FcDomainIdOrZero,  
fcmInstanceIndex, fcmSwitchIndex, FcAddressIdOrZero  
    FROM FC-MGMT-MIB -- [FC-MGMT]  
T11NsGs4RejectReasonCode  
    FROM T11-FC-NAME-SERVER-MIB -- [FC-NS-MIB]  
T11FabricIndex  
    FROM T11-TC-MIB -- [FC-FAM-MIB]  
t11FamLocalSwitchWwn  
    FROM T11-FC-FABRIC-ADDR-MGR-MIB; -- [FC-FAM-MIB]
```

```
t11FcFabricConfigServerMIB MODULE-IDENTITY
```

```
LAST-UPDATED "200602130000Z"
```

```
ORGANIZATION "T11"
```

```
CONTACT-INFO
```

```
" Claudio DeSanti  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134 USA  
EMail: cds@cisco.com
```

```
Keith McCloghrie  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134 USA  
Email: kzm@cisco.com"
```

```
DESCRIPTION
```

```
"The MIB module for the management of a Fabric
```

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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.

"

REVISION "200602130000Z"

DESCRIPTION

"Initial version of this MIB module."

::= { mib-2 nnn } -- to be determined later

```
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

--

T11ListIndex ::= TEXTUAL-CONVENTION

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)

T11ListIndexPointer ::= TEXTUAL-CONVENTION

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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 T11ListIndex defined in the table's INDEX clause, or, zero to indicate an empty list. The definition of an object with this syntax must identify the table(s) into which it points."

SYNTAX Unsigned32

FcIeType ::= TEXTUAL-CONVENTION

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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, Table 124."

SYNTAX INTEGER {
 unknown(1),
 other(2),
 switch(3),
 hub(4),
 bridge(5)
}

FcPortState ::= 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, table 134."


```
SYNTAX INTEGER {
    unknown(1),
    other(2),
    online(3),
    offline(4),
    testing(5),
    fault(6)
}
```

FcPortTxType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The technology of the port transceiver:

```
unknown      - unknown (includes the 'null' type)
other        - some other technology
shortwave850nm - Short wave laser - SN (850 nm)
longwave1550nm - Long wave laser - LL (1550 nm)
longwave1310nm - Long wave laser cost
                reduced - LC (1310 nm)
electrical   - Electrical - EL."
```

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, table 129."

```
SYNTAX INTEGER {
    unknown(1),
    other(2),
    shortwave850nm(3),
    longwave1550nm(4),
    longwave1310nm(5),
    electrical(6)
}
```

T11FcsRejectReasonExplanation ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The reject reason code explanation:

```
noAdditionalExplanation(1)
    - no additional explanation.
invNameIdForIEOrPort(2)
    - 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 platform attribute block.

invalidAttribBlockLength(25)

- invalid platform attribute block length.

attributesMissing(26)

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- required platform attributes not present."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, table 152."

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

DESCRIPTION

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

::= { t11FcsDiscovery 1 }

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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 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 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.

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 this object is set to 'localOnly'.

If a manager sets this object 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [section 6.2.3.2](#)."

INDEX { fcmInstanceIndex, fcmSwitchIndex, t11FcsFabricIndex,
t11FcsIeName }

::= { t11FcsIeTable 1 }


```
T11FcsIeEntry ::= SEQUENCE {
    t11FcsIeName          FcNameIdOrZero,
    t11FcsIeType          FcIeType,
    t11FcsIeDomainId      FcDomainIdOrZero,
    t11FcsIeMgmtId        FcAddressIdOrZero,
    t11FcsIeFabricName    FcNameIdOrZero,
    t11FcsIeLogicalName   OCTET STRING,
    t11FcsIeMgmtAddrListIndex T11ListIndexPointer,
    t11FcsIeInfoList      OCTET STRING,
    t11FcsIePortListIndex T11ListIndexPointer
}
```

```
t11FcsIeName OBJECT-TYPE
    SYNTAX      FcNameIdOrZero
    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 xxx-200x, Fibre Channel - Generic Services 5,
        FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.2.1."
    ::= { t11FcsIeEntry 1 }
```

```
t11FcsIeType OBJECT-TYPE
    SYNTAX      FcIeType
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The type of this Interconnect Element."
    REFERENCE
        "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
        FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5,
```

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FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.2.4."
DEFVAL { '000000'h }
 ::= { t11FcsIeEntry 4 }

t11FcsIeFabricName OBJECT-TYPE
SYNTAX FcNameIdOrZero
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 xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, 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
"The logical name of this Interconnect Element.
When the logical name is unknown, this object contains
the zero-length string."
REFERENCE
"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.2.6."
 ::= { t11FcsIeEntry 6 }

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t11FcsIeMgmtAddrListIndex OBJECT-TYPE

SYNTAX T11ListIndexPointer

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 xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, 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.
This object contains 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 xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.2.8"

::= { t11FcsIeEntry 8 }

t11FcsIePortListIndex OBJECT-TYPE

SYNTAX T11ListIndexPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The port list for this Interconnect Element. This object
points to an entry in the t11FcsPortListTable."

::= { t11FcsIeEntry 9 }

--

-- 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 T11ListIndex,

t11FcsMgmtAddrIndex Unsigned32,

t11FcsMgmtAddr SnmpAdminString

}

t11FcsMgmtAddrListIndex OBJECT-TYPE

SYNTAX T11ListIndex

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 SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The management address of this entry.

The format of this object may be based on the format of the Uniform Resource Locator (URL).

For example, for SNMP, see [RFC 4088](#)."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [section 6.2.3.2.7](#)"

::= { t11FcsMgmtAddrListEntry 3 }

--

-- Port List table

--

t11FcsPortListTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FcsPortListEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains all the lists of ports that are associated with Interconnect Elements contained in t11FcsIeTable."

::= { t11FcsDiscoveredConfig 3 }

t11FcsPortListEntry OBJECT-TYPE

SYNTAX T11FcsPortListEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry which identifies that the port which has the port name, t11FcsPortName, is in a particular list of ports, which is known to a switch (identified by fcmInstanceIndex and fcmSwitchIndex)."

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11FcsPortListIndex, t11FcsPortName }

::= { t11FcsPortListTable 1 }

T11FcsPortListEntry ::= SEQUENCE {

t11FcsPortListIndex T11ListIndex

}

t11FcsPortListIndex OBJECT-TYPE


```
SYNTAX      T11ListIndex
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The index value of the port list."
 ::= { t11FcsPortListEntry 1 }
```

```
--
-- Ports
--
```

```
t11FcsPortTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11FcsPortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains information about the ports which
         are grouped into lists by the t11FcsPortListTable."
 ::= { t11FcsDiscoveredConfig 4 }
```

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

```
INDEX { fcmInstanceIndex, fcmSwitchIndex,
         t11FcsFabricIndex, t11FcsPortName }
 ::= { t11FcsPortTable 1 }
```

```
T11FcsPortEntry ::= SEQUENCE {
    t11FcsPortName          FcNameIdOrZero,
    t11FcsPortType          FcPortType,
    t11FcsPortTxType        FcPortTxType,
    t11FcsPortModuleType    Unsigned32,
    t11FcsPortPhyPortNum    Unsigned32,
    t11FcsPortAttachPortNameIndex T11ListIndexPointer,
    t11FcsPortState         FcPortState,
    t11FcsPortSpeedCapab    OCTET STRING,
    t11FcsPortOperSpeed     OCTET STRING,
    t11FcsPortZoningEnfStatus OCTET STRING
}
```


t11FcsPortName OBJECT-TYPE
SYNTAX FcNameIdOrZero
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The Port_Name (WWN) of the port for which this row
 contains information."
REFERENCE
 "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
 FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5,
 FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.3.2."
 ::= { t11FcsPortEntry 2 }

t11FcsPortTxType OBJECT-TYPE
SYNTAX FcPortTxType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The Port TX Type of this port."
REFERENCE
 "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
 FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5,
 FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.3.4."
 ::= { t11FcsPortEntry 4 }

t11FcsPortPhyPortNum OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The physical number for this port."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.3.5."

::= { t11FcsPortEntry 5 }

t11FcsPortAttachPortNameIndex OBJECT-TYPE

SYNTAX T11ListIndexPointer

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 xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.3.6."

::= { t11FcsPortEntry 6 }

t11FcsPortState OBJECT-TYPE

SYNTAX FcPortState

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The state of this port."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5,
FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.3.8."

::= { t11FcsPortEntry 8 }

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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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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 T11ListIndex,
    t11FcsAttachPortName          OCTET STRING
}
```

```
t11FcsAttachPortNameListIndex OBJECT-TYPE
    SYNTAX          T11ListIndex
    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 xxx-200x, Fibre Channel - Generic Services 5,
        FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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 | T11ListIndexPointer, |
| t11FcsPlatformMgmtAddrListIndex | T11ListIndexPointer, |
| t11FcsPlatformVendorId | SnmpAdminString, |
| t11FcsPlatformProductId | SnmpAdminString, |
| t11FcsPlatformProductRevLevel | SnmpAdminString, |
| t11FcsPlatformDescription | SnmpAdminString, |
| t11FcsPlatformLabel | SnmpAdminString, |


```
t11FcsPlatformLocation      SnmpAdminString,
t11FcsPlatformSystemID     SnmpAdminString,
t11FcsPlatformSysMgmtAddr  T11ListIndexPointer,
t11FcsPlatformClusterId    SnmpAdminString,
t11FcsPlatformClusterMgmtAddr T11ListIndexPointer,
t11FcsPlatformFC4Types     OCTET STRING
}
```

t11FcsPlatformIndex OBJECT-TYPE

SYNTAX Unsigned32

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 (0..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, as specified in FC-GS-5."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [section 6.2.3.4.2](#)"

::= { t11FcsPlatformEntry 2 }

t11FcsPlatformType OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (4))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [section 6.2.3.4.3](#)"

::= { t11FcsPlatformEntry 3 }

t11FcsPlatformNodeNameListIndex OBJECT-TYPE

SYNTAX T11ListIndexPointer

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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [section 6.2.3.4.6](#)"

::= { t11FcsPlatformEntry 4 }

t11FcsPlatformMgmtAddrListIndex OBJECT-TYPE

SYNTAX T11ListIndexPointer

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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [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."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [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."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, [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."
REFERENCE
    "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
    FC-GS-5 T11/Project 1677-D/Rev 8, 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. This value should
    include the full name and version identification of the
    platform's hardware type and software operating system."
REFERENCE
    "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
    FC-GS-5 T11/Project 1677-D/Rev 8, 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."
REFERENCE
    "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
    FC-GS-5 T11/Project 1677-D/Rev 8, 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
    (e.g., 'telephone closet, 3rd floor')."
REFERENCE
    "ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5,
    FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.4.12"
 ::= { t11FcsPlatformEntry 11 }
```

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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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.4.5"

::= { t11FcsPlatformEntry 12 }

t11FcsPlatformSysMgmtAddr OBJECT-TYPE

SYNTAX T11ListIndexPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A list of management addresses for the platform."

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, section 6.2.3.4.5"

::= { t11FcsPlatformEntry 14 }

t11FcsPlatformClusterMgmtAddr OBJECT-TYPE

SYNTAX T11ListIndexPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

REFERENCE

"ANSI INCITS xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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 xxx-200x, Fibre Channel - Generic Services 5, FC-GS-5 T11/Project 1677-D/Rev 8, 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      T11ListIndex,
    t11FcsNodeName                FcNameIdOrZero
}

t11FcsNodeNameListIndex OBJECT-TYPE
    SYNTAX      T11ListIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index value of the node name list."
    ::= { t11FcsNodeNameListEntry 1 }

t11FcsNodeName OBJECT-TYPE
    SYNTAX      FcNameIdOrZero
    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."
```

```
    ::= { 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."
```

```
    ::= { 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."
```

```
    ::= { 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."
 ::= { 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."
 ::= { 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."
 ::= { 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."
 ::= { 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."
 ::= { 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 't11FcsReqRejectNotify' 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
--
```

```
t11FcsReqRejectNotify 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 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
```

```
MIN-ACCESS read-only
```

```
DESCRIPTION
```

```
    "Write access is not required."
```

```
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,  
t11FcsIePortListIndex,  
t11FcsMgmtAddr,  
t11FcsPortListIndex,  
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."
```

```
::= { 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 { t11FcsReqRejectNotify,  
               t11FcsDiscoveryCompleteNotify,  
               t11FcsMgmtAddrChangeNotify }
```

```
STATUS current
```

```
DESCRIPTION
```

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

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

```
END
```


7. Acknowledgements

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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 other members of T11.5.

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10. Authors' Addresses

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Retired

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

t11FcsPortListTable

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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