

Internet Draft

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Fibre-Channel Zone Server MIB
T11/06-047v1 and [draft-kzm-imss-fc-zs-mib-03.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 a Fibre Channel Zone Server. At present, this memo is being proposed to T11.5 (<http://www.t11.org>). The plan is that it will later become a work item of 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 Zone Server.

1.1. Change Log

This section to be deleted when the document becomes approved.

1.1.1. Initial version

The initial version was submitted to T11.5 as T11/05-505v0 on 25 July 2005.

1.1.2. Changes made in 19 January version

The following changes were made for the version dated 19 January 2006, which was submitted to T11.5 as: T11/06-047v0.

- The MIB module for GS Server Sessions (T11-GS-SESSIONS-MIB) was changed to be the MIB module for Fibre Channel Fabric locks (T11-FC-FABRIC-LOCK-MIB). The t11GssSessionTable table was changed to be the t11FLockTable table, and the INDEX-ing changed to include GS_Type and GS_SubType values.
- Three reason code objects were added to the t11FLockTable to hold the reason code, the reason code explanation, and the reason vendor code if and when a lock request is rejected by an SW_RJT.
- The ability to commit Zone changes (which was in t11GssSessionTable) was not included in the t11FLockTable. Instead, it was added as a new object, t11ZsServerCommit, in the T11-FC-ZONE-SERVER-MIB.
- The descriptions of t11ZsTxChangeRequests, t11ZsRxChangeAccepts, t11ZsRxChangeRequests & t11ZsTxChangeAccepts were clarified to indicate they include Enhanced Commit Service requests/responses, and that they include requests/responses in both Basic & Enhanced

modes.

- t11ZsServerDistributeFailReason was replaced by three objects t11ZsServerReasonCode, t11ZsServerReasonCodeExp and

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t11ZsServerReasonVendorCode to contain the individual codes separately.

- t11ZsRejectReasonVendorCode was added in the t11ZsNotifyControlTable and as an additional object in the t11ZsRequestRejectNotify notification.
- t11ZsRxGS5Requests and t11ZsTxGS5Rejects were renamed to t11ZsRxZsRequests and t11ZsTxZsRejects, their descriptions updated to be described as Zone Server requests/responses (rather than GS-5 requests/responses).

1.1.3. Changes made in 5 March version

The following changes were made for the version which was submitted to T11.5 as: T11/06-047v1, and to the IETF as: [draft-kzm-imss-fc-zs-mib-03.txt](#).

- Updated the DESCRIPTION of the t11FlockTable to mention locks via ACAs and locks via EACAs.
- Defined the t11FlockApplicationID to be used in the INDEX clause of the t11FlockTable, replacing t11FlockGsType and t11FlockGsSubType (which get deleted).
- Changed the 'gsClient' label of the t11FlockInitiatorType object to 'ssb' so as to accommodate FC-SP clients as well as GS-5 clients.
- Changed "Rx" to "In" and "Tx" to "Out" in the descriptors of Counter32's, e.g., changed t11ZsRxZsRequests to t11ZsInZsRequests.
- 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

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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 both an address identifier and a WWN. For an Nx_Port, its WWN is called a N_Port_Name and its address identifier is called a N_Port_ID. 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.

Zones within a fabric provide a mechanism to control frame delivery between Nx_Ports ("Hard Zoning") or to expose selected views of Name Server information ("Soft Zoning"). This technique is similar to virtual private networks in that the fabric has the ability to group devices into Zones.

Administrators create Zones to increase network security, and prevent data loss or corruption, by controlling access between devices or user groups. Zones may be specifically used to create:

- a) Barriers between devices that use different operating systems. It is often critical to separate servers and storage devices with different operating systems because accidental transfer of information from one to another may delete or corrupt data;
- b) Logical subsets of closed user groups. Administrators may authorize access rights to specific Zones for specific user groups, thereby protecting confidential data from unauthorized access;
- c) Groups of devices that are separate from devices in the rest of a fabric. Zones allow certain processes to be performed on devices in a group without interrupting devices in other

groups; or

- d) Temporary access between devices for specific purposes. Administrators may remove Zone restrictions temporarily, then restore Zone restrictions to perform normal processes.

Zones are configured via a Fabric Zone Server, using requests defined in FC-GS-5 [[FC-GS-5](#)]), or via the T11-FC-ZONE-SERVER-MIB module defined in this memo, or via some other mechanism.

An Nx_Port may be a member of one or more Zones. Zone membership may be specified by:

- a) The N_Port_Name of the Nx_Port connected to the switch;
- b) The N_Port_ID assigned during Fabric Login;
- c) The Node_Name associated with the Nx_Port; note that the Node_Name may include more than one Nx_Port;
- d) The F_Port_Name of the Fx_Port to which the Nx_Port is connected; or
- e) The domain identification (Domain_ID) and physical port number of the Switch Port to which the Nx_Port is attached.

A fabric's Zone Server may be used to create a Zone by specifying the Zone Members. One or more Zones may be collected into a Zone Set, and a Zone may be a member of more than one Zone Set. A Zone Set creates a collection of Zones that may be activated or deactivated as a single entity across all Switches in a fabric (e.g., having two Zone Sets, one for normal operation, and a second for backup during off-hours). Only one Zone Set may be activated at one time.

Other terminology defined in [[FC-GS-5](#)] is: an Active Zone Set is the Zone Set currently enforced by a fabric; a Zone Set Database is a database of the Zone Sets available to be activated within a fabric; and a Zoning Database is a generic term used to indicate a combination of an Active Zone Set and a Zone Set Database.

Two distinct sets of management requests, Enhanced and Basic, are defined in [[FC-GS-5](#)] to interact with a Fabric Zone Server. Basic Zoning provides compatibility with [[FC-GS-4](#)] and earlier versions of

Fibre Channel's Generic Services specification. If all the Switches in a fabric support the Enhanced request set, then it may be used to manage zoning; otherwise only the Basic request set may be used, in order to support backward compatibility.

In the context of Enhanced Zoning Management, a management action (i.e., write access to the Zoning Database) to the Zone Server can only occur inside a server session. A server session is setup using the FC-GS-5's Common Transport (CT) protocol defined in [[FC-GS-5](#)]. A server session is delimited by CT protocol requests, Server Session Begin (SSB) and Server Session End (SSE), which are directed to the Management Service and which have the GS_Subtype specifying the Zone Server. Query requests that result in read access to the Zoning Database are not required to be issued inside a server session, although the information returned is not guaranteed to be consistent when supplied outside of a server session.

When setting-up a server session for Enhanced Zoning, the Zone Server is required to lock the fabric. This ensures serialized management access to the Zoning Database and guarantees a deterministic behavior. The switch which receives the SSB request is called the 'managing' switch, and it tries to lock the fabric using the Fabric Management Session Protocol (see section 10.6 of [[FC-SW-4](#)]) by sending an Acquire Change Authorization (ACA) request to all other switches in the fabric. If any switch(es) respond with an SW_RJT indicating failure, then the attempt to lock the fabric fails and the SSB request is rejected. If all the other switches respond with an SW_ACC indicating success, then the fabric is locked and the server

session can be established. The subsequent SSE request causes an Release Change Authorization (RCA) request to all other switches, and thus, the fabric to be unlocked.

For at least one application other than Zoning, the managing switch uses a different type of request to lock the fabric, i.e., it sends an Enhanced Acquire Change Authorization (EACA) request to all other switches in the fabric. An EACA reserves local resources associated with a designated application to ensure the consistency of that application's data. The application is identified in the EACA using an Application_ID (see Table 116 in [[FC-SW-4](#)]). A lock which was

established via an EACA is released using an Enhanced Release Change Authorization (ERCA) request.

Changes requested in a Zoning Database by Enhanced Zoning commands persist after the end of the Zoning (server) session only if the commands are followed, within the same server session, by a Commit Zone Changes (CMIT) request. On receipt of a CMIT request, the Zone Server checks that the Zoning Database as modified by the outstanding changes will pass the applicable consistency checks, and then distributes it to all other switches in the fabric using a Stage Fabric Configuration Update (SFC) request. If all other switches accept the SFC request, then the "managing" switch sends an Update Fabric Configuration (UFC) Request to each other switch, and the staged Zoning Database thereby becomes the fabric's (active) Zoning Database.

[4.](#) Relationship to Other MIBs

The Fibre Channel Management MIB [[FC-MGMT](#)] defines basic information for Fibre Channel hosts and switches, including extensions to the standard IF-MIB [[RFC2863](#)] for Fibre Channel interfaces.

This MIB extends beyond [[FC-MGMT](#)] to cover the management of Fibre Channel Zoning Servers, both for Basic Zoning Management and for Enhanced Zoning Management, as defined in the FC-GS-5 specification.

This MIB imports some common Textual Conventions from T11-TC-MIB, defined in [[FC-FAM-MIB](#)]. It also imports a TC from T11-FC-NAME-SERVER-MIB, defined in [[FC-NSM-MIB](#)].

[5.](#) MIB Overview

This document defines two MIB modules: T11-FC-FABRIC-LOCK-MIB and T11-FC-ZONE-SERVER-MIB.

T11-FC-FABRIC-LOCK-MIB supports FC-GS-5's generic capability of locking the fabric for a particular "application" such as (the management of) Enhanced Zoning. The MIB contains one table in which each entry represents a particular switch being the 'managing' switch of a particular application's fabric lock.

T11-FC-ZONE-SERVER-MIB is specific to the operation of Zone Servers, which can operate in Basic mode or in Enhanced mode. This MIB module imports the T11NsGs4RejectReasonCode textual convention defined in T11-FC-NAME-SERVER-MIB [[FC-NS-MIB](#)].

[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 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

The latest standard for an interconnecting fabric containing multiple Fabric Switch elements is [\[FC-SW-4\]](#); it specifies the operation of both a single fabric in a physical infrastructure, as well as the support of multiple Virtual Fabrics operating within one (or more) physical infrastructures. Whether operating on a physical fabric (i.e., without Virtual Fabrics) or within a Virtual Fabric, the operation of a Zone Server within a fabric is identical. Therefore, this MIB defines all fabric-related information in tables which are INDEX-ed by an arbitrary integer, named a "Fabric Index", having the syntax, T11FabricIndex, which is IMPORTed from the T11-TC-MIB [\[FC-FAM-MIB\]](#). 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.

[5.4.](#) Basic and Enhanced Modes

The two Zone Server modes, Basic and Enhanced, have a sufficient amount of commonality to make it worth having one set of MIB objects which are used for the subset common to both modes. To accommodate the differences, additional MIB objects are defined.

For Enhanced mode, the additional objects are defined in a group, t11ZsEnhancedModeGroup, which is only required to be implemented in a Zone Server capable of supporting Enhanced mode. The objects specific to Basic mode are always (even in Enhanced mode) expected to be implemented, but when in Enhanced mode, their values are either restricted or do not affect current operations, e.g.,

- an example of "restricted" is: the distribution of updates to the Zone Server database throughout the fabric has to be requested explicitly in Basic mode; this functionality is provided in the MIB by the t11ZsServerDistribute object. In contrast, in Enhanced mode, the distribution is an implicit part of the commit function which is initiated using the t11ZsServerCommit object. Thus, when operating in Enhanced mode, t11ZsServerDistribute has a fixed value, and when operating in Basic mode, t11ZsServerCommit has a fixed value.
- an example of "do not affect current operations" is: t11ZsServerHardZoning which specifies whether a switch enforces hard Zoning on a fabric when in Basic mode. This object is

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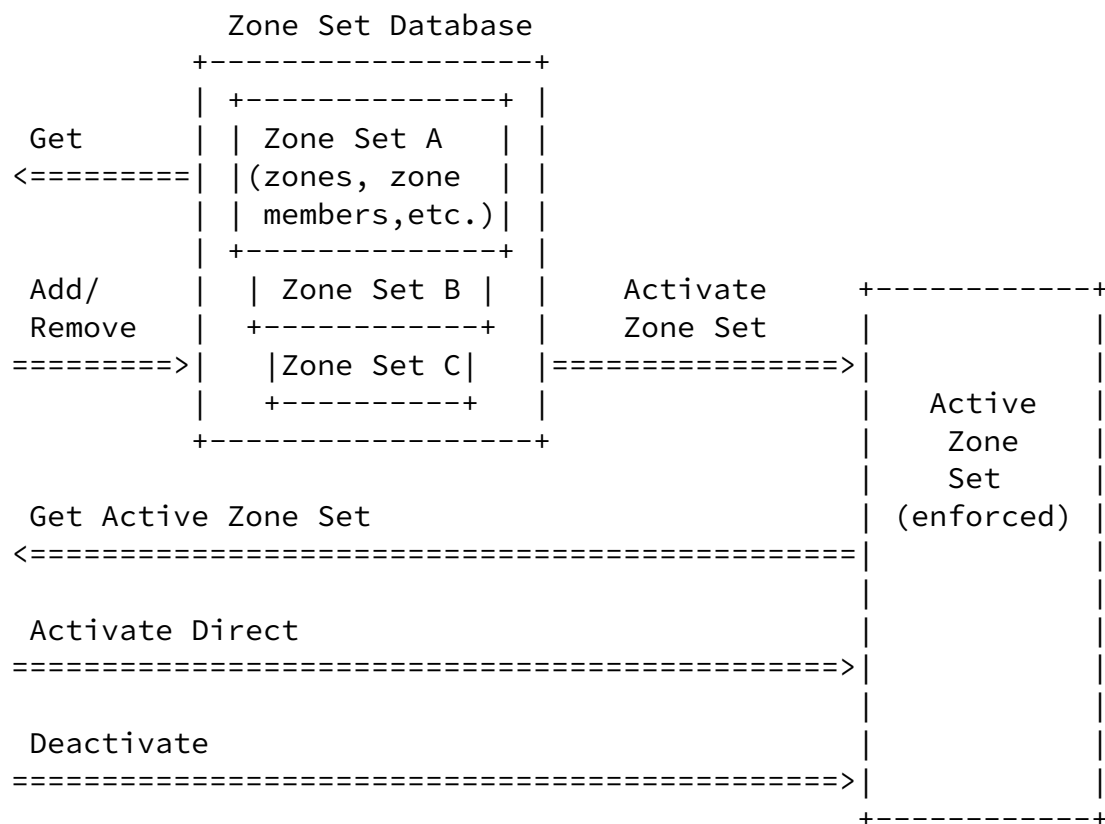
instantiated and could even be modified while in Enhanced mode, but its value only takes effect when in Basic mode. (Note that in Enhanced mode, `t11ZsActiveHardZoning` specifies whether hard Zoning is enabled on a particular Zone.)

[5.5.](#) Persistent Storage

A Zone Server Database for a given fabric consists of the combination of many of the tables defined in this MIB module. In order to ensure that such a Database is consistent, this MIB module defines just one object (`t11ZsServerDatabaseStorageType`) with a syntax of `StorageType`, whose value for a given fabric is defined to be applicable to all of that fabric's Zone Server Database as defined in all the tables in this MIB module.

[5.6.](#) The Active Zone Set and the Zone Set Database

As described in FC-GS-5 [[FC-GS-5](#)], one of the Zone Sets in the Zone Set Database can be activated to become the Active Zone Set, i.e., the one which is enforced on the fabric. Get/Add/Remove-type requests are defined in FC-GS-5 to allow access to the Zone Set Database. When the Zone Set Database is modified, such modifications don't affect the Active Zone Set unless and until a subsequent activation. Interaction directly with the Active Zone Set is also possible via the FC-GS-5 requests: 'Activate Direct' and 'Get Active Zone Set'. This is illustrated in the following rendition of Figure 15 of [[FC-GS-5](#)]:



The T11-FC-ZONE-SERVER-MIB module, defined in [section 7](#), models the above structure by having one set of MIB tables for the Zone Set Database and a separate set for the Active Zone Set, specifically:

- seven tables for the Zone Set Database: t11ZsSetTable, t11ZsZoneTable, t11ZsSetZoneTable, t11ZsAliasTable, t11ZsZoneMemberTable, t11ZsAttribBlockTable and t11ZsAttribTable.
- four tables for the Active Zone Set: t11ZsActiveTable, t11ZsActiveZoneTable, t11ZsActiveZoneMemberTable and t11ZsActiveAttribTable.

[5.7.](#) Conformance Groups

[5.7.1.](#) The t11ZsBasicGroup

This group contains objects to retrieve and to modify the Zoning configuration of a Zone Server capable of operating in Basic mode.

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[5.7.2.](#) The t11ZsEnhancedModeGroup

This group contains objects to retrieve and to modify the Zoning configuration of a Zone Server capable of operating in Enhanced mode.

[5.7.3.](#) The t11ZsActivateGroup

This group contains objects which allow a Zone Set to be activated via SNMP SetRequests and provide the status and result of such an activation.

[5.7.4.](#) The t11ZsStatisticsGroup

This group contains objects for collecting Zone Server statistics.

[5.7.5.](#) The t11ZsNotificationGroup

This group contains notifications for monitoring: Zone merge successes and failures, Zone Server request rejections, changes in the Default Zoning behaviour, and the success or failure of an attempt to activate or deactivate a Zone Set.

[5.7.6.](#) The t11ZsNotificationControlGroup

This group contains objects which allow each type of notification (in the t11ZsNotificationGroup group) to be independently enabled or disabled. It also contains objects which are used to include useful information in those notifications; these objects are defined as read-only to allow the values contained in the most recent notification to be queried.

[6.](#) The T11-FC-FABRIC-LOCK-MIB Module

```
T11-FC-FABRIC-LOCK-MIB  DEFINITIONS ::= BEGIN
```

IMPORTS

```
    MODULE-IDENTITY, OBJECT-TYPE,
    mib-2                      FROM SNMPv2-SMI    -- [RFC2578]
    RowStatus                  FROM SNMPv2-TC     -- [RFC2579]
    MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF -- [RFC2580]
    fcmInstanceIndex, fcmSwitchIndex FROM FC-MGMT-MIB -- [FC-MGMT]
    T11NsGs4RejectReasonCode
                                FROM T11-FC-NAME-SERVER-MIB -- [FC-NS-MIB]
    T11FabricIndex             FROM T11-TC-MIB;   -- [FC-FAM-MIB]
```

```
t11FabricLockMIB  MODULE-IDENTITY
    LAST-UPDATED   "200603050000Z"
    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 locks on a Fibre Channel fabric. A Fibre Channel fabric lock is used to ensure serialized access to some types of management data related to a fabric, e.g., the fabric's Zoning Database.

Some (managing) applications generate fabric locks by initiating server sessions. Server sessions are defined generically in FC-GS-5 to represent a collection of one or more requests to the session's server, e.g., to the Zone Server. Such a session is started by a Server Session Begin (SSB) request, and terminated by a Server Session End (SSE) request. The switch receiving the SSB is called the 'managing' switch. Some applications require the 'managing' switch to lock the fabric for the particular

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application, e.g., for Enhanced Zoning, before it can respond successfully to the SSB. On receipt of the subsequent SSE, the lock is released. For this usage, the managing switch sends an Acquire Change Authorization (ACA) request to other switches to lock the fabric.

For some other applications, a managing switch locks the fabric using an Enhanced Acquire Change Authorization (EACA) request, which identifies the application on whose behalf the fabric is being locked with an Application_ID.

Fabric locks can also be requested more directly, e.g., through the use of this MIB. In these situations, the term 'managing' switch is used to indicate the switch which receives such a request and executes it by issuing either ACA or EACA requests to other switches in the fabric.

This MIB module defines information about the 'managing' switch for currently-active fabric locks."

REVISION "200603050000Z"

DESCRIPTION

"Initial version of this MIB.

Copyright (C) The Internet Society (2006). 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

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

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

t11FLockMIBObjects OBJECT IDENTIFIER ::= { t11FabricLockMIB 1 }

t11FLockMIBConformance OBJECT IDENTIFIER ::= { t11FabricLockMIB 2 }

t11FLockMIBNotifications OBJECT IDENTIFIER ::= { t11FabricLockMIB 0 }

t11FLockConfiguration OBJECT IDENTIFIER ::= { t11FLockMIBObjects 1 }

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--

-- The table of Managing Switches and their Fabric Locks

--

t11FLockTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11FLockEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing information about the 'managing'
switch of each current fabric lock, e.g., for the
types of Servers defined in FC-GS-5."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel – Generic Services-5 (FC-GS-5),
4 October 2005, sections [4.9.5](#) and [6.4.10.2](#)."
 ::= { t11FlockConfiguration 1 }

t11FlockEntry OBJECT-TYPE

SYNTAX T11FlockEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"Each entry contains information specific to a current fabric lock setup by a particular 'managing' switch on a particular fabric. The 'managing switch' is identified by values of fcmInstanceIndex and fcmSwitchIndex.

Server sessions for several different types of servers are defined in FC-GS-5. The behavior of a server with respect to commands received within a server session is specified for each type of server. For some types, parameter changes can only be made within the context of a session, and the setting up of a session requires that the fabric be locked. A fabric is locked by one switch, called the 'managing' switch, sending Acquire Change Authorization (ACA) requests to all other switches in the fabric.

For other applications, a fabric lock is established by the 'managing' switch sending Enhanced Acquire Change Authorization (EACA) requests to other switches in the fabric. Each EACA request includes an Application_ID value to identify the application.

Thus, locks established via EACAs can be identified via an

Application_ID. This table is specified based on the assumption that all locks can be identified via an Application_ID. In order to meet this assumption, it is expected that otherwise-unused Application_ID values will be reserved for use in this MIB so that they can serve as identifiers of locks established via ACAs.

Whenever a fabric is locked, by the sending of either an ACA or an EACA, a row gets created in the representation of this table for the 'managing' switch.

In order to process SNMP SetRequests which make parameter changes for the relevant types of servers (e.g., to the Zoning Database), the SNMP agent must get serialized access to the fabric (for the relevant type of management data), i.e., the fabric must be locked by creating an entry in this table via an SNMP SetRequest. Creating an entry in this table via an SNMP SetRequest causes an ACA or an EACA to be sent to all other switches in the fabric. The value of t11FLockApplicationID for such an entry determines whether an ACA or an EACA is sent.

If an entry in this table is created by an SNMP SetRequest, the value of the t11FLockInitiatorType object in that entry will normally be 'snmp'. A row for which the value of t11FLockInitiatorType is not 'snmp' cannot be deleted via t11FLockRowStatus. Note that it's possible for a row to be created by an SNMP SetRequest but for the setup of the lock to fail, and immediately thereafter be replaced by a lock successfully setup by some other means; in such a case, the value of t11FLockInitiatorType would change as and when the lock was setup by the other means, and so the row could not thereafter be deleted via t11FLockRowStatus.

FC-GS-5 mentions various error situations in which a fabric lock is released so as to avoid a deadlock. In such situations, the agent removes the corresponding row in this table as and when the lock is released."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel - Generic Services-5 (FC-GS-5), 4 October 2005, sections [4.9.5.5](#) and [6.4.7.1](#).

ANSI INCITS xxx/200x, T11/Project 1674-D/Rev 7.7, Fibre Channel - Switch Fabric-4 (FC-SW-4),

```

INDEX    { fcmInstanceIndex, fcmSwitchIndex, t11FlockFabricIndex,
           t11FlockApplicationID }
 ::= { t11FlockTable 1 }

```

```

T11FlockEntry ::= SEQUENCE {
    t11FlockFabricIndex      T11FabricIndex,
    t11FlockApplicationID    OCTET STRING,
    t11FlockInitiatorType    INTEGER,
    t11FlockInitiator        OCTET STRING,
    t11FlockStatus           INTEGER,
    t11FlockRejectReasonCode T11NsGs4RejectReasonCode,
    t11FlockRejectReasonCodeExp OCTET STRING,
    t11FlockRejectReasonVendorCode OCTET STRING,
    t11FlockRowStatus        RowStatus
}

```

t11FlockFabricIndex 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."

```
 ::= { t11FlockEntry 1 }
```

t11FlockApplicationID OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (1))

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The Application_ID value which identifies the type of application for which the fabric is locked."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1674-D/Rev 7.7,
Fibre Channel - Switch Fabric-4 (FC-SW-4),
8 December 2005, table 116."
 ::= { t11FLockEntry 2 }

t11FLockInitiatorType OBJECT-TYPE

SYNTAX INTEGER {
other(1),
ssb(2),
cli(3),
snmp(4)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object specifies what type of initiator generated
the request which caused this lock to be established:

other - none of the following.
ssb - this lock was established due to the
receipt of an SSB, e.g., from a GS-5
client.
cli - this lock was established in order
to process a Command Line Interface
(CLI) command.
snmp - this lock was established as a result
of an SNMP SetRequest.

"

::= { t11FLockEntry 3 }

t11FLockInitiator OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..64))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object specifies the initiator whose request
caused this lock to be established:

If the value of the corresponding instance
of t11FLockInitiatorType is 'ssb', this
object will contain the FC_ID of the client
which issued the Server Session Begin (SSB)
which required the lock to be established.

If the value of the corresponding instance

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of t11FlockInitiatorType object is 'cli', this object will contain the user name of the CLI (Command Line Interface) user on whose behalf the lock was established.

If the value of the corresponding instance of t11FlockInitiatorType is 'snmp', this object will contain the source IP address of the SNMP SetRequests which created this entry. The format of the address will be:

- for IPv4, n.n.n.n,
- for IPv6, in any of the three conventional forms listed in [section 2.2 of RFC 3513](#)."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel - Generic Services-5 (FC-GS-5), 4 October 2005, [section 4.9.5.2](#).

[RFC 3513](#), Internet Protocol Version 6 (IPv6) Addressing Architecture, April 2003."

::= { t11FlockEntry 4 }

t11FlockStatus OBJECT-TYPE

SYNTAX INTEGER {
 active(1),
 settingUp(2),
 rejectFailure(3),
 otherFailure(4)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object gives the current status of the lock:

'active'	-- the lock is currently established.
'settingUp'	-- the 'managing' switch is currently attempting to setup the lock, e.g., it is waiting to receive Accepts for ACAs from every switch in the fabric.

'rejectFailure' -- the 'managing' switch's attempt to
setup the lock was rejected with
the reason codes given by:
t11FLockRejectReasonCode,

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t11FLockRejectReasonCodeExp and
t11FLockRejectReasonVendorCode.
'otherFailure' -- the 'managing' switch's attempt
to setup the lock failed (but no
reason codes are available).

For values of t11FLockInitiatorType other than 'snmp',
a row is only required to be instantiated in this table
when the value of this object is 'active'.

If the value of the corresponding instance of
t11FLockInitiatorType is 'snmp', the initial value of this
object when the row is first created is 'settingUp'. As
and when the setup succeeds, the value transitions to
'active'. If the setup fails, the value transitions to
either 'rejectFailure' or 'otherFailure'. Note that such a
failure value is overwritten on the next attempt to obtain
the lock, which could be immediately after the failure,
e.g., by a GS-5 client.

When the value of this object is 'rejectFailure', the
rejection's reason codes are given by the corresponding
values of t11FLockRejectReasonCode,
t11FLockRejectReasonCodeExp and
t11FLockRejectReasonVendorCode."

::= { t11FLockEntry 5 }

t11FLockRejectReasonCode OBJECT-TYPE

SYNTAX T11NsGs4RejectReasonCode

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When the value of the corresponding instance of
t11FLockStatus is 'rejected', this object contains
the rejection's reason code."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel – Generic Services-5 (FC-GS-5), 4 October 2005, [section 4.4.4](#) and table 10."

::= { t11FlockEntry 6 }

t11FlockRejectReasonCodeExp OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(1))

MAX-ACCESS read-only

STATUS current

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DESCRIPTION

"When the value of the corresponding instance of t11FlockStatus is 'rejected', this object contains the rejection's reason code explanation."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel – Generic Services-5 (FC-GS-5), 4 October 2005, sections [4.4.4](#) and [6.4.9](#), tables 11 and 270."

::= { t11FlockEntry 7 }

t11FlockRejectReasonVendorCode OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(1))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When the value of the corresponding instance of t11FlockStatus is 'rejected', this object contains the rejection's vendor-specific code."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel – Generic Services-5 (FC-GS-5), 4 October 2005, [section 4.4.4](#)."

::= { t11FlockEntry 8 }

t11FlockRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this conceptual row.

A row for which the value of t11FlockInitiatorType is not 'snmp' cannot be deleted via this object."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel – Generic Services-5 (FC-GS-5), 4 October 2005, [section 6.4.10.2.3](#)."

::= { t11FlockEntry 9 }

-- Conformance

t11FlockMIBCompliances

OBJECT IDENTIFIER ::= { t11FlockMIBConformance 1 }

t11FlockMIBGroups OBJECT IDENTIFIER ::= { t11FlockMIBConformance 2 }

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t11FlockMIBCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for entities which support fabric locks in support of GS-5 Server applications."

MODULE MANDATORY-GROUPS { t11FlockActiveGroup }

OBJECT t11FlockRowStatus

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

::= { t11FlockMIBCompliances 1 }

-- Units of Conformance

t11FlockActiveGroup OBJECT-GROUP

OBJECTS { t11FlockInitiatorType,
t11FlockInitiator,
t11FlockStatus,
t11FlockRejectReasonCode,
t11FlockRejectReasonCodeExp,
t11FlockRejectReasonVendorCode,

```

        t11FLockRowStatus
    }
STATUS    current
DESCRIPTION
    "A collection of objects containing information
    about current fabric locks."
::= { t11FLockMIBGroups 1 }

END

```

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7. The T11-FC-ZONE-SERVER-MIB Module

T11-FC-ZONE-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, RowStatus,
StorageType,
TruthValue, TimeStamp

FROM SNMPv2-TC

-- [[RFC2579](#)]

```

SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB -- [RFC3411]
ifIndex          FROM IF-MIB -- [RFC2863]
fcmInstanceIndex, fcmSwitchIndex,
FcNameIdOrZero,
FcDomainIdOrZero 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]

t11ZoneServerMIB MODULE-IDENTITY
    LAST-UPDATED "200603050000Z"
    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

```

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"The MIB module for the management of Fibre Channel Zoning Servers, both for Basic Zoning Management and for Enhanced Zoning Management, as defined in the FC-GS-5 specification.

FC-GS-5 defines (in-band) management operations for manipulating the Zone Set Database, some for use in Basic mode (e.g., 'Add Zone Set (AZS)', etc.), and some for use in Enhanced mode (e.g., 'Create Zone Set (CZS)', etc.). When Enhanced Zoning Management is in use, FC-GS-5 requires that these in-band management operations be rejected unless they are issued within the context of a GS-5 server session. The

use of a server session ensures serialized access to the Zoning Database since the fabric lock for the Zone Server must be obtained as a part of establishing the server session to the Zone Server.

Thus, if and when this MIB is used for Enhanced Zoning Management, SNMP SetRequests which request the modification of zoning definitions must be serialized with respect to the GS-5 requests to modify the Zoning Database. This is achieved by requiring that an SNMP management application must first obtain the fabric lock for the Zone Server before attempting to modify any zoning definitions. The companion T11-FC-FABRIC-LOCK-MIB module is defined as a means of obtaining the fabric lock for the Zone Server (or any other server).

In Enhanced Zoning Management, a Zone Server keeps track of changes requested in the zoning definitions, but does not update its Zone Set Database unless and until a 'commit' operation. To model this behaviour, this MIB module assumes that a Zone Server (in Enhanced mode) takes a snapshot of its Zone Set Database as and when the fabric lock (for the Zone Server application) is obtained; this snapshot is used to create what is herein called the 'copy' database. It is this 'copy' database which is then updated by SNMP SetRequests (while the fabric is locked). If and when a 'commit' operation is requested (while the fabric is still locked), the 'copy' database is then used to overwrite the previously-committed contents of the Zone Set Database, and the new Zone Set Database is distributed to all other switches in the fabric. When the lock is released, any changes made which were not 'committed' are discarded.

When this MIB is used for Basic Zoning Management, the same

set of MIBs objects as used for Enhanced mode are used to make changes to the Database of a Zone Server on a particular switch, but the changes take immediate effect at that switch without an explicit commit. The distribution of those changes to Zone Servers on other switches in the

fabric is subsequently requested through the use of a separate set of MIB objects.

Copyright (C) The Internet Society (2006). 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 "200603050000Z"
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

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

t11ZsMIBObjects OBJECT IDENTIFIER ::= { t11ZoneServerMIB 1 }
t11ZsMIBConformance OBJECT IDENTIFIER ::= { t11ZoneServerMIB 2 }
t11ZsMIBNotifications OBJECT IDENTIFIER ::= { t11ZoneServerMIB 0 }
t11ZsConfiguration OBJECT IDENTIFIER ::= { t11ZsMIBObjects 1 }
t11ZsStatistics OBJECT IDENTIFIER ::= { t11ZsMIBObjects 2 }

-- Textual Conventions

T11ZsZoneMemberType ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Represents the addressing mechanism by which a member is identified:

01 - N_Port_Name
02 - Domain_ID and physical port
03 - N_Port_ID
04 - Node_Name
05 - Alias Name
06 - F_Port_Name
E0-FF (hex) - Vendor Specific.

"

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),

4 October 2005, [section 6.4.8.3.6](#)."

SYNTAX Unsigned32 (0..255)

T11ZsRejectReasonExplanation ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The reason code explanation when rejecting a
Zone Server request:

'other'

- e.g., a reason code assigned too recently
to be included in this version of this MIB

'noAdditionalExplanation'

- there is no additional explanation

'zonesNotSupported'

- Zones are not supported

'zoneSetNameUnknown'

- Zone Set name is not known

'noZoneSetActive'

- no Zone Set is currently active

'zoneNameUnknown'

- Zone name is unknown

'zoneStateUnknown'

- state of the Zone is not known

'incorrectPayloadLen'

- payload length is not correct

'tooLargeZoneSet'

- Zone Set is larger than permitted size

'deactivateZoneSetFailed'

- deactivation of Zone Set failed

'reqNotSupported'

- request is not supported

'capabilityNotSupported'

- capability is not supported

'zoneMemberIDTypeNotSupp'

- Zone Member Identifier Type is not supported

'invalidZoneSetDefinition'

- Zone Set definition is invalid

'enhancedZoningCmdsNotSupported'

- Enhanced Zoning commands are not supported

'zoneSetExists'

- Zone Set already exists

'zoneExists'

- Zone already exists

'aliasExists'

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- Zone Alias already exists

'zoneSetUnknown'

- Zone Set unknown

'zoneUnknown'

- Zone unknown

'aliasUnknown'

- Zone Alias unknown

'zoneAliasTypeUnknown'

- unknown Zone attribute type

'unableEnhancedMode'

- fabric unable to work in Enhanced Mode

'basicZoningCmdsNotSupported'

- Basic Zoning commands are not supported

'zoneAttribObjectExists'

- Zone attribute object already exists

'zoneAttribObjectUnknown'

- Zone attribute object unknown

'requestInProgress'

- request in process

'cmitInProgress'

- CMIT in process

'hardEnforcementFailed'

- hard enforcement failed

'unresolvedReferences'

- unresolved references in the Zone Set Database

'consistencyChecksFailed'

- consistency checks failed."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.9](#)."

SYNTAX

INTEGER {
 other(1),
 noAdditionalExplanation(2),
 zonesNotSupported(3),
 zoneSetNameUnknown(4),
 noZoneSetActive(5),
 zoneNameUnknown(6),
 zoneStateUnknown(7),
 incorrectPayloadLen(8),
 tooLargeZoneSet(9),
 deactivateZoneSetFailed(10),
 reqNotSupported(11),

capabilityNotSupported(12),
zoneMemberIDTypeNotSupp(13),

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```
invalidZoneSetDefinition(14),  
enhancedZoningCmdsNotSupported(15),  
zoneSetExists(16),  
zoneExists(17),  
aliasExists(18),  
zoneSetUnknown(19),  
zoneUnknown(20),  
aliasUnknown(21),  
zoneAliasTypeUnknown(22),  
unableEnhancedMode(23),  
basicZoningCmdsNotSupported(24),  
zoneAttribObjectExists(25),  
zoneAttribObjectUnknown(26),  
requestInProgress(27),  
cmitInProgress(28),  
hardEnforcementFailed(29),  
unresolvedReferences(30),  
consistencyChecksFailed(31)  
}
```

T11ZoningName ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This datatype is a refinement of an SnmpAdminString,
and is used to represent a name stored in a Fibre
Channel Zoning Data Structure.

The value begins with a letter (upper or lower case)
followed by zero or more characters from the set:
lower case letters, upper case letters, numbers, and
the symbols (\$-^_).

The value does not include fill bytes."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.8.1](#)."

--
-- The table of Zone Servers
--

t11ZsServerTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsServerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing information about the Zone Servers on each fabric in one or more switches, and providing the capability to perform operations on their Zone Server databases."

::= { t11ZsConfiguration 1 }

t11ZsServerEntry OBJECT-TYPE

SYNTAX T11ZsServerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry contains information specific to a Zone Server for a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex)."

INDEX { fcmInstanceIndex, fcmSwitchIndex,
 t11ZsServerFabricIndex }

::= { t11ZsServerTable 1 }

T11ZsServerEntry ::= SEQUENCE {

t11ZsServerFabricIndex

T11FabricIndex,

t11ZsServerCapabilityObject	BITS,
t11ZsServerDatabaseStorageType	StorageType,
t11ZsServerDistribute	INTEGER,
t11ZsServerCommit	INTEGER,
t11ZsServerResult	INTEGER,
t11ZsServerReasonCode	T11NsGs4RejectReasonCode,
t11ZsServerReasonCodeExp	OCTET STRING,
t11ZsServerReasonVendorCode	OCTET STRING,
t11ZsServerLastChange	TimeStamp,
t11ZsServerHardZoning	TruthValue,
t11ZsServerReadFromDatabase	INTEGER,
t11ZsServerOperationMode	INTEGER,
t11ZsServerChangeModeResult	INTEGER,
t11ZsServerDefaultZoneSetting	INTEGER,

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t11ZsServerMergeControlSetting	INTEGER,
t11ZsServerDefZoneBroadcast	TruthValue

}

t11ZsServerFabricIndex 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."

::= { t11ZsServerEntry 1 }

t11ZsServerCapabilityObject OBJECT-TYPE

SYNTAX BITS {
 enhancedMode(0),
 zonesetDb(1),
 activateDirect(2),
 hardZoning(3)
 }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "This bitmap represents the capability of the switch
 on this fabric:

 'enhancedMode' - able to support enhanced Zoning
 mode of operation.

 'zonesetDb' - able to support maintaining of
 a Zone Set Database.

 'activateDirect' - able to support the Activate
 Direct command.

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 'hardZoning' - able to support Hard Zoning."
REFERENCE
 "Fibre Channel - Switch Fabric - 4 (FC-SW-4),
 T11/Project 1674-D/Rev 7.6, November 2005,
 [section 6.1.23.4.4](#)"
 ::= { t11ZsServerEntry 2 }

t11ZsServerDatabaseStorageType OBJECT-TYPE

SYNTAX StorageType
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"This object specifies the memory realization, on a
particular switch, of the Zone Set database for a
particular fabric. Specifically, each row in the
following tables:

 t11ZsSetTable
 t11ZsZoneTable

```

t11ZsSetZoneTable
t11ZsAliasTable
t11ZsZoneMemberTable
t11ZsAttribBlockTable
t11ZsAttribTable

```

has a StorageType as specified by the instance of this object which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex.

This value of this object is also used to indicate the persistence across reboots of writable values in its row of the t11ZsServerTable, as well as the corresponding row in the t11ZsNotifyControlTable.

If an instance of this object has the value 'permanent(4)', the Zone Set database for the given fabric on the given switch is not required to be writeable."

```

DEFVAL { nonVolatile }
::= { t11ZsServerEntry 3 }

```

t11ZsServerDistribute OBJECT-TYPE

```

SYNTAX      INTEGER {
                noop(1),

```

```

                zonesetDb(2)
            }
MAX-ACCESS    read-write
STATUS        current
DESCRIPTION

```

"This object can be set only in Basic mode. When set to the value 'zonesetDb', it requests that the Zone Set database of a particular switch for a particular fabric be distributed to every other switch in that fabric, e.g., by using Stage Fabric Configuration Update (SFC) and Update Fabric Configuration (UFC) requests.

Setting this object to 'noop' has no effect.

When read, the value of this object is always 'noop'.

Setting this object will fail if the corresponding instance of t11ZsServerOperationMode has the value 'enhanced', or if the corresponding instance of t11ZsZoneSetResult has the value 'InProgress'."

REFERENCE

"Fibre Channel - Switch Fabric - 4 (FC-SW-4),
T11/Project 1674-D/Rev 7.6, November 2005,
[section 6.1.19.1](#)."

::= { t11ZsServerEntry 4 }

t11ZsServerCommit OBJECT-TYPE

SYNTAX INTEGER {
commitZoneChanges(1),
noop(2)
}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object is only used in Enhanced mode.

In Enhanced mode, it can only be modified when the fabric lock for the Zone Server on the particular fabric has been obtained for use by SNMP SetRequests, and even then, only by the SNMP entity identified by the value of corresponding instance of t11FLockInitiator.

Setting the object requests an action:

commitZoneChanges - requests that the changes made
within this session to the Zone

noop Set Database be committed.
- requests nothing.

When read, the value is always 'noop'."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),

4 October 2005, [section 6.4.10.2](#).
 ::= { t11ZsServerEntry 5 }

t11ZsServerResult OBJECT-TYPE

SYNTAX INTEGER {
 none(1),
 inProgress(2),
 success(3),
 rejectFailure(4),
 otherFailure(5)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"In Basic mode, this object indicates the status/result of the last distribution of the Zone Set database which was invoked via the corresponding instance of t11ZsZoneSetDistribute, e.g., the status/result of Stage Fabric Configuration Update (SFC) request(s) used to implement the setting of t11ZsZoneSetDistribute.

In Enhanced mode, this object indicates the status/result of the last commit of changes to the Zone Set database which was invoked via the corresponding instance of t11ZsServerCommit.

'none'	- no distribution/commit invoked via the corresponding instance of t11ZsZoneSetDistribute (Basic mode) or t11ZsServerCommit (Enhanced mode).
'inProgress'	- distribution/commit is still in progress.
'success'	- distribution/commit completely successfully.
'rejectFailure'	- distribution/commit failed due to a SW_RJT.
'otherFailure'	- distribution/commit failed for some other reason.

When the value is 'rejectFailure', the corresponding

instances of t11ZsServerReasonCode,
t11ZsServerReasonCodeExp and t11ZsServerReasonVendorCode
contain the reason codes. "

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel – Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.10.2.3](#)."

::= { t11ZsServerEntry 6 }

t11ZsServerReasonCode OBJECT-TYPE

SYNTAX T11NsGs4RejectReasonCode

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When the corresponding instance of t11ZsZoneSetResult
has the value 'rejectFailure', this object contains
the rejection's reason code.

When the corresponding instance of t11ZsServerResult
has a value other than 'rejectFailure', this object
should contain the value 'none'."

REFERENCE

"Fibre Channel – Switch Fabric – 4 (FC-SW-4), Rev 7.6,
November 2005, [section 6.1.3](#) and tables 4, 5 & 6."

::= { t11ZsServerEntry 7 }

t11ZsServerReasonCodeExp OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0 | 1))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When the corresponding instance of t11ZsZoneSetResult
has the value 'rejectFailure', this object contains
the rejection's reason code explanation.

When the corresponding instance of t11ZsServerResult
has a value other than 'rejectFailure', this object
should contain the zero-length string."

REFERENCE

"Fibre Channel – Switch Fabric – 4 (FC-SW-4), Rev 7.6,
November 2005, [section 6.1.3](#) and tables 4, 5 & 6."

::= { t11ZsServerEntry 8 }

t11ZsServerReasonVendorCode OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0 | 1))
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "When the corresponding instance of t11ZsZoneSetResult
 has the value 'rejectFailure', this object contains
 the rejection's reason vendor-specific code.

 When the corresponding instance of t11ZsServerResult
 has a value other than 'rejectFailure', this object
 should contain the zero-length string."

REFERENCE
 "Fibre Channel - Switch Fabric - 4 (FC-SW-4), Rev 7.6,
 November 2005, [section 6.1.3](#) and tables 4, 5 & 6."
::= { t11ZsServerEntry 9 }

t11ZsServerLastChange OBJECT-TYPE

SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The value of sysUpTime at the time of the last change
 (creation, modification or deletion) to the Zone Set
 database for the Zone Server for a particular fabric.
 If said Zone Set database has not changed since the
 last re-initialization of the local network management
 system, then this object will contain a zero value."
::= { t11ZsServerEntry 10 }

t11ZsServerHardZoning OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "This object indicates whether this switch, if and when it
 is in Basic mode, enforces Hard Zoning on this fabric."
REFERENCE
 "ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
 Fibre Channel - Generic Services-5 (FC-GS-5),
 4 October 2005, [section 6.4.10.3.2](#)."
::= { t11ZsServerEntry 11 }

t11ZsServerReadFromDatabase OBJECT-TYPE

SYNTAX INTEGER {
 committedDB(1),

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```
        copyDB(2)
    }
MAX-ACCESS      read-write
STATUS          current
DESCRIPTION
    "In Enhanced mode, this object specifies whether
    subsequent SNMP Responses (generated by the local SNMP
    agent) to operations which read the configuration of
    Zone Sets, Zones, Members, Aliases and Attributes will
    reflect the values stored in the current (committed)
    Zone Set database, or those stored in the 'copy'
    database.

    In Basic mode, the value of this object is always
    'committedDB' (since there is no 'copy' database in
    Basic mode). In SNMP agents which don't support
    write access to the Zone Set database, this object
    is always 'committedDB' (since the copy database,
    if it were to exist, would be identical)."
```

```
DEFVAL { committedDB }
 ::= { t11ZsServerEntry 12 }
```

t11ZsServerOperationMode OBJECT-TYPE

```
SYNTAX          INTEGER {
                    basic(1),
                    enhanced(2)
                }
MAX-ACCESS      read-write
STATUS          current
DESCRIPTION
    "The operational mode of the Zone Server.
```

Setting this object to 'enhanced' is a request that the mode of operation of the Zone Server be Enhanced mode, which is only possible if all devices in the Fibre Channel fabric are capable of working in Enhanced mode. If not, the request will fail and the corresponding value of t11ZsServerChangeModeResult will so indicate.

Setting this object to 'basic' requests the mode of operation of the Zone Server be Basic mode. However,

such a set may fail while operating in Enhanced mode, since FC-GS-5 makes no provision for changing (back) to Basic mode.

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Note that setting this object does not cause or require that the fabric lock for the Zone Server be obtained. However, when this object has the value 'enhanced', any SNMP SetRequests which attempt to modify the copy database can not be successful if the fabric lock has not been obtained or has since been released."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2, Fibre Channel - Generic Services-5 (FC-GS-5), 4 October 2005, sections [6.4.10.1.1](#) and [6.4.10.1.2](#)."

DEFVAL { basic }

::= { t11ZsServerEntry 13 }

t11ZsServerChangeModeResult OBJECT-TYPE

SYNTAX INTEGER {
 success(1),
 failure(2),
 inProgress(3),
 none(4)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"When this object has the value of 'success' or 'failure', the value indicates the outcome of the most recent request, invoked via t11ZsServerOperationMode, to change the mode of operation of the Zone Server. When such a request is in progress, this object has the value 'inProgress'. Prior to the first such request, the value of this object is 'none'."

::= { t11ZsServerEntry 14 }

t11ZsServerDefaultZoneSetting OBJECT-TYPE

SYNTAX INTEGER {
 permit(1),

```

        deny(2)
    }
MAX-ACCESS      read-write
STATUS          current
DESCRIPTION
    "This object controls the Enhanced Zoning flag which
    governs the behaviour of the Default Zone on this fabric.

    If this object is set to 'permit', then the members of
    the Default Zone on this fabric can communicate with

```

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each other.

If this object is set to 'deny', then the members of the Default Zone on this fabric cannot communicate with each other."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel – Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.10.1.1](#)."

DEFVAL { deny }

::= { t11ZsServerEntry 15 }

t11ZsServerMergeControlSetting OBJECT-TYPE

```

SYNTAX          INTEGER {
                    allow(1),
                    restrict(2)
                }

```

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object controls the Enhanced Zoning flag which indicates the Merge Control Setting for this fabric:

- 'allow' - a switch may join the fabric only if its Zoning Database is able to merge with the fabric's Zoning Database.
- 'restrict' - a switch may join the fabric only if its Zoning Database is equal to the fabric's Zoning Database."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.10.1.1](#)."

DEFVAL { allow }

::= { t11ZsServerEntry 16 }

t11ZsServerDefZoneBroadcast OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object controls an Enhanced Zoning capability:
it indicates whether Broadcast Zoning is enabled on
the Default Zone on this fabric. If this object is
set to 'true', then it is enabled. If this object is

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set to 'false', then it is disabled.

If broadcast Zoning is enabled on a Default Zone,
then broadcast frames generated by a member in that
Default Zone will be restricted to members in that
Default Zone."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.7.2.2](#)."

::= { t11ZsServerEntry 17 }

--

-- The table of Zone Sets

--

t11ZsSetTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsSetEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table containing information on every Zone
Set in the Zone Set database of the Zone Servers

on each fabric in one or more switches.

In Enhanced mode, changes to a database made via this table are always made to the 'copy' database, but values read from this table reflect the contents of either the 'copy' database or the current (committed) database as indicated by the corresponding value of t11ZsServerReadFromDatabase."

::= { t11ZsConfiguration 2 }

t11ZsSetEntry OBJECT-TYPE

SYNTAX T11ZsSetEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry contains information about a Zone Set in the Zone Set database of a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex).

A Zone Set is created containing zero or more

existing Zones. As and when new Zones are created (as rows in the t11ZsZoneTable), they can be added to a Zone Set by creating an entry for each in the t11ZsSetZoneTable.

The StorageType of a row in this table is specified by the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11ZsServerFabricIndex, t11ZsSetIndex }

::= { t11ZsSetTable 1 }

T11ZsSetEntry ::= SEQUENCE {

t11ZsSetIndex Unsigned32,

t11ZsSetName T11ZoningName,

t11ZsSetRowStatus RowStatus

}

t11ZsSetIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index of a Zone Set. This object uniquely identifies a Zone Set in the Zone Set database for a particular fabric on a particular switch."

::= { t11ZsSetEntry 1 }

t11ZsSetName OBJECT-TYPE

SYNTAX T11ZoningName

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The name of this Zone Set. The t11ZsSetName should be unique within a fabric.

The Zone Set can be renamed by setting this object to a new value."

::= { t11ZsSetEntry 2 }

t11ZsSetRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

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DESCRIPTION

"The status of this conceptual row.

This object can not be set to 'active' unless the corresponding value of t11ZsSetName is unique within the fabric's Zone Server database on this switch."

::= { t11ZsSetEntry 3 }

--

-- The table of Zones

--

t11ZsZoneTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsZoneEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table gives information on all the Zones in the Zone Set database of the Zone Servers on each fabric in one or more switches.

In Enhanced mode, changes to a database made via this table are always made to the 'copy' database, but values read from this table reflect the contents of either the 'copy' database or the current (committed) database as indicated by the corresponding value of t11ZsServerReadFromDatabase."

::= { t11ZsConfiguration 3 }

t11ZsZoneEntry OBJECT-TYPE

SYNTAX T11ZsZoneEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry contains information about a Zone in the Zone Set database of a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex).

To create a Zone, first create an entry in this table, and then add members to it by creating entries in the t11ZsZoneMemberTable.

The StorageType of a row in this table is specified by

the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11ZsServerFabricIndex, t11ZsZoneIndex }

```

 ::= { t11ZsZoneTable 1 }

T11ZsZoneEntry ::= SEQUENCE {
    t11ZsZoneIndex      Unsigned32,
    t11ZsZoneName       T11ZoningName,
    t11ZsZoneAttribBlock Unsigned32,
    t11ZsZoneRowStatus  RowStatus
}

t11ZsZoneIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index value which uniquely identifies this
        Zone within a particular fabric's Zone Set database
        on a particular switch."
    ::= { t11ZsZoneEntry 1 }

t11ZsZoneName OBJECT-TYPE
    SYNTAX      T11ZoningName
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The name of this Zone. The t11ZsZoneName should be
        unique within a fabric.

        The Zone can be renamed by setting this object
        to a new value."
    ::= { t11ZsZoneEntry 2 }

t11ZsZoneAttribBlock OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4294967295)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This object specifies the index value of the
        Zone Attribute Block which contains the Attributes
        of this Zone."

```


In Enhanced mode, a value of zero indicates this Zone has no Zone Attributes. In Basic mode, this object always has the value of zero."

::= { t11ZsZoneEntry 3 }

t11ZsZoneRowStatus OBJECT-TYPE

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"The status of this conceptual row.

This object can not be set to 'active' unless the corresponding value of t11ZsZoneName is unique within the fabric's Zone Server database on this switch."

::= { t11ZsZoneEntry 4 }

--

-- The table specifying the Zones which belong to each Zone Set

--

t11ZsSetZoneTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsSetZoneEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"This table specifies which Zones belong to which Zone Sets in the Zone Set database of the Zone Servers on each fabric in one or more switches."

::= { t11ZsConfiguration 4 }

t11ZsSetZoneEntry OBJECT-TYPE

SYNTAX T11ZsSetZoneEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"Each entry specifies that a particular Zone (identified by the value of t11ZsZoneIndex) is one of the Zones which form a particular Zone Set (identified by the value of t11ZsSetIndex) in the Zone Set database of a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex).

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The StorageType of a row in this table is specified by the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

```
INDEX    { fcmInstanceIndex, fcmSwitchIndex,
            t11ZsServerFabricIndex,
            t11ZsSetIndex, t11ZsZoneIndex }
 ::= { t11ZsSetZoneTable 1 }
```

```
T11ZsSetZoneEntry ::= SEQUENCE {
    t11ZsSetZoneRowStatus      RowStatus
}
```

t11ZsSetZoneRowStatus OBJECT-TYPE

```
SYNTAX      RowStatus
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION
    "The status of this conceptual row."
 ::= { t11ZsSetZoneEntry 1 }
```

```
--
-- The table of Zone Aliases
--
```

t11ZsAliasTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF T11ZsAliasEntry
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION
    "This table contains information about the Zone Aliases
    in the Zone Set database of the Zone Servers on each
    fabric in one or more switches.
```

In Enhanced mode, changes to a database made via this table are always made to the 'copy' database, but values read from this table reflect the contents of either the 'copy' database or the current (committed) database as indicated by the corresponding value of t11ZsServerReadFromDatabase."

```
 ::= { t11ZsConfiguration 5 }
```

t11ZsAliasEntry OBJECT-TYPE

SYNTAX T11ZsAliasEntry
MAX-ACCESS not-accessible

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STATUS current

DESCRIPTION

"Each entry contains information about a Zone Alias in the Zone Set database of a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex).

A Zone Member is added to a Zone Alias by creating an entry in the t11ZsZoneMemberTable pointing to a row of this table via t11ZsAliasIndex, i.e.,:

- t11ZsZoneMemberParentType = 'alias',
- t11ZsZoneMemberParentIndex = Alias's t11ZsAliasIndex,
- t11ZsZoneMemberFormat != '05 - Alias Name', and
- t11ZsZoneMemberID = Member's identifier.

A Zone Alias is added to a Zone by creating an entry in the t11ZsZoneMemberTable pointing to a row of this table via t11ZsAliasName, i.e.,:

- t11ZsZoneMemberParentType = 'zone', and
- t11ZsZoneMemberParentIndex = Zone's t11ZsZoneIndex,
- t11ZsZoneMemberFormat = '05 - Alias Name',
- t11ZsZoneMemberID = Alias's t11ZsAliasName.

The StorageType of a row in this table is specified by the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

INDEX { fcmInstanceIndex, fcmSwitchIndex,
 t11ZsServerFabricIndex, t11ZsAliasIndex }
 ::= { t11ZsAliasTable 1 }

T11ZsAliasEntry ::= SEQUENCE {
 t11ZsAliasIndex Unsigned32,
 t11ZsAliasName T11ZoningName,

```
    t11ZsAliasRowStatus      RowStatus
}
```

```
t11ZsAliasIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
```

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```
    "An index value which uniquely identifies this Zone
    Alias within the Zone Set database of a particular
    fabric on a particular switch."
 ::= { t11ZsAliasEntry 1 }
```

```
t11ZsAliasName OBJECT-TYPE
    SYNTAX      T11ZoningName
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
```

```
    "The name of this Zone Alias.  The name of the Zone
    Alias should be unique within a fabric.
```

```
    The Zone Alias can be renamed by setting this object
    to a new value if and when it is not in a Zone, i.e.,
    if and only if the current name is not the value of
    any t11ZsZoneMemberID in the same Zone Set database."
 ::= { t11ZsAliasEntry 2 }
```

```
t11ZsAliasRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
```

```
    "The status of this conceptual row.
```

```
    This object can not be set to 'active' unless the
    corresponding value of t11ZsAliasName is unique within
    the fabric's Zone Server database on this switch."
 ::= { t11ZsAliasEntry 3 }
```

--
-- The table of Zone Members
--

t11ZsZoneMemberTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsZoneMemberEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains all members of a Zone/Zone Alias and information about those members in the Zone Set database of the Zone Servers on each fabric in one or more switches.

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In Enhanced mode, changes to a database made via this table are always made to the 'copy' database, but values read from this table reflect the contents of either the 'copy' database or the current (committed) database as indicated by the corresponding value of t11ZsServerReadFromDatabase."

::= { t11ZsConfiguration 6 }

t11ZsZoneMemberEntry OBJECT-TYPE

SYNTAX T11ZsZoneMemberEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry represents the relationship between a member and (one of) its 'parent(s)', i.e., a Zone or Zone Alias to which the member belongs, within a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex).

A Zone member (other than an alias) is added to a Zone by creating an entry in this table having:

- t11ZsZoneMemberParentType = 'zone', and

- t11ZsZoneMemberParentIndex = Zone's t11ZsZoneIndex,
- t11ZsZoneMemberFormat != '05 - Alias Name',
- t11ZsZoneMemberID = Member's identifier.

The StorageType of a row in this table is specified by the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

```
INDEX    { fcmInstanceIndex, fcmSwitchIndex,
           t11ZsServerFabricIndex, t11ZsZoneMemberParentType,
           t11ZsZoneMemberParentIndex, t11ZsZoneMemberIndex }
::= { t11ZsZoneMemberTable 1 }
```

```
T11ZsZoneMemberEntry ::= SEQUENCE {
    t11ZsZoneMemberParentType    INTEGER,
    t11ZsZoneMemberParentIndex   Unsigned32,
    t11ZsZoneMemberIndex         Unsigned32,
    t11ZsZoneMemberFormat        T11ZsZoneMemberType,
    t11ZsZoneMemberID            OCTET STRING,
    t11ZsZoneMemberRowStatus     RowStatus
}
```

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}

t11ZsZoneMemberParentType OBJECT-TYPE

```
SYNTAX      INTEGER {
                zone(1), -- member belongs to a Zone
                alias(2) -- member belongs to a Zone Alias
            }
```

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object determines whether this member belongs to a Zone or an Zone Alias."

```
::= { t11ZsZoneMemberEntry 1 }
```

t11ZsZoneMemberParentIndex OBJECT-TYPE

```
SYNTAX      Unsigned32 (1..4294967295)
```

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object contains the index value of the Zone or Zone Alias to which this member belongs.

If the value of the corresponding instance of t11ZsZoneMemberParentType is 'zone', then this object will contain the value of the t11ZsZoneIndex object of the Zone to which this member belongs.

If the value of the corresponding instance of t11ZsZoneMemberParentType is 'alias', then this object will contain the value of the t11ZsAliasIndex object of the Zone Alias to which this member belongs."

::= { t11ZsZoneMemberEntry 2 }

t11ZsZoneMemberIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index value which uniquely identifies this Zone Member amongst all Zone Members in the Zone Set database of a particular fabric on a particular switch."

::= { t11ZsZoneMemberEntry 3 }

t11ZsZoneMemberFormat OBJECT-TYPE

SYNTAX T11ZsZoneMemberType

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MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object identifies the format of the Zone/Zone Alias member's identifier contained in t11ZsZoneMemberID.

This object can not be modified while the corresponding value of t11ZsZoneMemberRowStatus object is 'active'."

::= { t11ZsZoneMemberEntry 4 }

t11ZsZoneMemberID OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (1..255))

MAX-ACCESS read-create
STATUS current
DESCRIPTION

"This object contains the Member Identifier of the Zone or Alias. The interpretation of this object depends on the value of the corresponding instance of t11ZsZoneMemberFormat:

- if t11ZsZoneMemberFormat is 'N_Port_Name', then this object contains a N_Port_Name.
- if t11ZsZoneMemberFormat is 'Domain_ID and physical port', then this object contains a 4-octet value in network-byte order. The first octet is zero, the second octet contains the Domain_ID, and the last two octets contain the physical port number.
- if t11ZsZoneMemberFormat is 'N_Port_ID', then this object contains the 3-octet Nx_Port FC_ID.
- if t11ZsZoneMemberFormat is 'Alias Name', then this object contains the value of t11ZsAliasName for some Alias in the same Zone Set database.
- if t11ZsZoneMemberFormat is 'Node_Name', then this object contains an 8-octet Node_Name.
- if t11ZsZoneMemberFormat is 'F_Port_Name', then this object contains an 8-octet F_Port_Name.
- if t11ZsZoneMemberFormat is one of the 'Vendor Specific' values, then this object contains a 1 to

255 octet value in a format defined by the relevant vendor.

This object cannot be modified while the corresponding value of t11ZsZoneMemberRowStatus object is 'active'."

::= { t11ZsZoneMemberEntry 5 }

t11ZsZoneMemberRowStatus OBJECT-TYPE

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"The status of this conceptual row.

The corresponding instances of t11ZsZoneMemberID and
t11ZsZoneMemberFormat objects MUST be set before or
concurrently with setting this object to 'active'."

::= { t11ZsZoneMemberEntry 6 }

--

-- The table of Zone Attribute Blocks

--

t11ZsAttribBlockTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsAttribBlockEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"This table gives information on all the Zone
Attributes in the Zone Set database of the Zone
Servers on each fabric in one or more switches.

In Enhanced mode, changes to a database made via this
table are always made to the 'copy' database, but
values read from this table reflect the contents of
either the 'copy' database or the current (committed)
database as indicated by the corresponding value of
t11ZsServerReadFromDatabase."

::= { t11ZsConfiguration 7 }

t11ZsAttribBlockEntry OBJECT-TYPE

SYNTAX T11ZsAttribBlockEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"Each entry contains information about a Zone Attribute

Block (of Zone Attributes) in the Zone Set database of a particular fabric (identified by the value of t11ZsServerFabricIndex) on a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex).

Deleting an entry in this table deletes all associated entries in the t11ZsAttribTable.

The StorageType of a row in this table is specified by the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

```
INDEX    { fcmInstanceIndex, fcmSwitchIndex,
           t11ZsServerFabricIndex, t11ZsAttribBlockIndex }
::= { t11ZsAttribBlockTable 1 }
```

```
T11ZsAttribBlockEntry ::= SEQUENCE {
    t11ZsAttribBlockIndex      Unsigned32,
    t11ZsAttribBlockName      T11ZoningName,
    t11ZsAttribBlockRowStatus RowStatus
}
```

t11ZsAttribBlockIndex OBJECT-TYPE

```
SYNTAX      Unsigned32 (1..4294967295)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
```

"An index value which uniquely identifies this Zone Attribute within the Zone Set database of a particular fabric on a particular switch."

```
::= { t11ZsAttribBlockEntry 1 }
```

t11ZsAttribBlockName OBJECT-TYPE

```
SYNTAX      T11ZoningName
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
```

"The name of this Zone Attribute Block, which should be unique within the fabric."

```
::= { t11ZsAttribBlockEntry 2 }
```

t11ZsAttribBlockRowStatus OBJECT-TYPE

```
SYNTAX      RowStatus
```

```
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION
    "The status of this conceptual row."
 ::= { t11ZsAttribBlockEntry 3 }
```

```
--
-- The table of Zone Attributes
--
```

```
t11ZsAttribTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11ZsAttribEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This table gives information on the Zone Attributes
        within the Zone Attribute Blocks in the Zone Set
        database of the Zone Servers on each fabric in one
        or more switches.

        In Enhanced mode, changes to a database made via this
        table are always made to the 'copy' database, but
        values read from this table reflect the contents of
        either the 'copy' database or the current (committed)
        database as indicated by the corresponding value of
        t11ZsServerReadFromDatabase."
    ::= { t11ZsConfiguration 8 }
```

```
t11ZsAttribEntry OBJECT-TYPE
    SYNTAX      T11ZsAttribEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry contains information about a Zone
        Attribute in a Zone Attribute Block (identified by
        t11ZsAttribBlockIndex) in the Zone Set database of
        a particular fabric (identified by the value of
        t11ZsServerFabricIndex) on a particular switch
        (identified by values of fcmInstanceIndex and
        fcmSwitchIndex).

        An entry in this table cannot be created prior to
        its associated entry in the t11ZsAttribBlockTable.

        The StorageType of a row in this table is specified by
```

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the instance of t11ZsServerDatabaseStorageType which is INDEX-ed by the same values of fcmInstanceIndex, fcmSwitchIndex and t11ZsServerFabricIndex."

```

INDEX    { fcmInstanceIndex, fcmSwitchIndex,
            t11ZsServerFabricIndex,
            t11ZsAttribBlockIndex, t11ZsAttribIndex }
 ::= { t11ZsAttribTable 1 }

T11ZsAttribEntry ::= SEQUENCE {
    t11ZsAttribIndex      Unsigned32,
    t11ZsAttribType       Unsigned32,
    t11ZsAttribValue      OCTET STRING,
    t11ZsAttribRowStatus  RowStatus
}

t11ZsAttribIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "An index value which uniquely identifies this
        Zone Attribute within its Zone Attribute Block in
        the Zone Set database of a particular fabric on a
        particular switch."
    ::= { t11ZsAttribEntry 1 }

t11ZsAttribType OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The type of attribute:

            0001      - Protocol
            0002      - Broadcast Zone
            0003      - Hard Zone
            00E0 (hex) - Vendor Specific."
    ::= { t11ZsAttribEntry 2 }

REFERENCE
    "ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
    Fibre Channel - Generic Services-5 (FC-GS-5),
    4 October 2005, section 6.4.8.3.8, table 267."

```

::= { t11ZsAttribEntry 2 }

t11ZsAttribValue OBJECT-TYPE
SYNTAX OCTET STRING (SIZE (0..255))

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MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The value of the attribute, formatted as specified
 in FC-GS-5 for the type given by the corresponding
 instance of t11ZsAttribType."
REFERENCE
 "ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
 Fibre Channel – Generic Services-5 (FC-GS-5),
 4 October 2005, [section 6.4.8.3.8](#), table 268."
::= { t11ZsAttribEntry 3 }

t11ZsAttribRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The status of this conceptual row."
::= { t11ZsAttribEntry 4 }

--
-- Activating a Zone Set
--

t11ZsActivateTable OBJECT-TYPE
SYNTAX SEQUENCE OF T11ZsActivateEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This table provides a mechanism to allow a Zone Set
 to be activated on a fabric."
::= { t11ZsConfiguration 9 }

t11ZsActivateEntry OBJECT-TYPE
SYNTAX T11ZsActivateEntry

```

MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "Each entry reflects the state of the activation of a
    Zone Set by a particular switch (identified by values
    of fcmInstanceIndex and fcmSwitchIndex) on a particular
    fabric (identified by the value of
    t11ZsServerFabricIndex)."
```

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11ZsServerFabricIndex }

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```
 ::= { t11ZsActivateTable 1 }
```

```

T11ZsActivateEntry ::= SEQUENCE {
    t11ZsActivateRequest      Unsigned32,
    t11ZsActivateDeactivate   INTEGER,
    t11ZsActivateResult       INTEGER,
    t11ZsActivateFailCause    SnmpAdminString,
    t11ZsActivateFailDomainId FcDomainIdOrZero
}
```

t11ZsActivateRequest OBJECT-TYPE

```

SYNTAX      Unsigned32 (0..4294967295)
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
```

"Setting this object to a value is a request for a Zone Set to be activated on the fabric which is represented by this row. The Zone Set to be activated is the one for which t11ZsSetIndex has the same value.

If a Zone Set is already active on a fabric when a request is made to activate a different one on that fabric, then the existing Zone Set is automatically deactivated and the specified Zone Set is activated in its place.

The value of this object when read is always 0."

```
 ::= { t11ZsActivateEntry 1 }
```

t11ZsActivateDeactivate OBJECT-TYPE

SYNTAX INTEGER {
 deactivate(1),
 noop(2)
 }

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Setting this object to 'deactivate' is a request to deactivate the currently active Zone Set on a fabric.

Note that the deactivation of the active Zone Set allows all ports to communicate or no ports to communicate depending on the current Default Zone

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behaviour.

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

When read, the value of this object is always 'noop'."

::= { t11ZsActivateEntry 2 }

t11ZsActivateResult OBJECT-TYPE

SYNTAX INTEGER {
 activateSuccess(1),
 activateFailure(2),
 deactivateSuccess(3),
 deactivateFailure(4),
 inProgress(5),
 none(6)
 }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates the outcome of the most recent activation/deactivation using this entry.

When the value of this object is 'inProgress', the values of the corresponding instances of

t11ZsActivateRequest and t11ZsActivateDeactivate
cannot be modified.

The value 'none' indicates activation/de-activation
has not been attempted."

::= { t11ZsActivateEntry 3 }

t11ZsActivateFailCause OBJECT-TYPE

SYNTAX SnmpAdminString (SIZE (0..64))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A textual message indicating the reason for the
most recent failure of a Zone Set activation or
de-activation, or the zero-length string if no
information is available.

When the corresponding instance of
t11ZsActivateResult is either 'activateFailure'
or 'deactivateFailure', the value of this object
indicates the reason for that failure."

::= { t11ZsActivateEntry 4 }

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t11ZsActivateFailDomainId OBJECT-TYPE

SYNTAX FcDomainIdOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"If the failure cause (as indicated by
t11ZsSetFailCause) was specific to a particular
device, this object contains the Domain_ID of that
device. Otherwise, this object contains zero."

::= { t11ZsActivateEntry 5 }

--

-- t11ZsActiveTable

--

t11ZsActiveTable OBJECT-TYPE

SYNTAX SEQUENCE OF T11ZsActiveEntry


```

MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
    "A table containing information on the currently
    enforced/active Zone Set on each fabric.
    An active Zone Set cannot be modified.
    This table will be empty when no Zone Set is
    activated."
 ::= { t11ZsConfiguration 10 }

```

```

t11ZsActiveEntry OBJECT-TYPE
    SYNTAX      T11ZsActiveEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry represents an active Zone Set of a
        particular fabric (identified by the value of
        t11ZsServerFabricIndex), according to a particular
        switch (identified by values of fcmInstanceId and
        fcmSwitchIndex)."
```

INDEX { fcmInstanceId, fcmSwitchIndex, t11ZsServerFabricIndex }

```

 ::= { t11ZsActiveTable 1 }

```

```

T11ZsActiveEntry ::= SEQUENCE {
    t11ZsActiveZoneSetName    T11ZoningName,
    t11ZsActiveActivateTime   TimeStamp
}

```

```

t11ZsActiveZoneSetName OBJECT-TYPE
    SYNTAX      T11ZoningName
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The name of this Zone Set on this fabric."
 ::= { t11ZsActiveEntry 1 }

```

```

t11ZsActiveActivateTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only

```

```

STATUS          current
DESCRIPTION
    "The value of sysUpTime at which this entry was most
    recently activated.  If this row was activated prior to
    the last re-initialization of the local network management
    system, then this object will contain a zero value."
 ::= { t11ZsActiveEntry 2 }

--
-- Zones in the Active/Enforced Zone Set
--

t11ZsActiveZoneTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11ZsActiveZoneEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains all the Zones that are present in
        the active Zone Sets on all fabrics."
    ::= { t11ZsConfiguration 11 }

t11ZsActiveZoneEntry OBJECT-TYPE
    SYNTAX      T11ZsActiveZoneEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry represents a Zone in the active Zone Set
        of a particular fabric (identified by the value of
        t11ZsServerFabricIndex), according to a particular
        switch (identified by values of fcmInstanceIndex and
        fcmSwitchIndex)."
```

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11ZsServerFabricIndex, t11ZsActiveZoneIndex }

```

 ::= { t11ZsActiveZoneTable 1 }
```

```

T11ZsActiveZoneEntry ::= SEQUENCE {
    t11ZsActiveZoneIndex      Unsigned32,
    t11ZsActiveZoneName      T11ZoningName,
    t11ZsActiveBroadcast      TruthValue,
    t11ZsActiveHardZoning     TruthValue
}
```

}

t11ZsActiveZoneIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index value which uniquely identifies this
this Zone within the active Zone Set on a
particular fabric."

::= { t11ZsActiveZoneEntry 1 }

t11ZsActiveZoneName OBJECT-TYPE

SYNTAX T11ZoningName

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The name of this Zone."

::= { t11ZsActiveZoneEntry 2 }

t11ZsActiveBroadcast OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates whether broadcast Zoning is
enabled on this Zone. If broadcast Zoning is enabled,
then broadcast frames generated by a member in this
Zone will be restricted to members in this Zone."

This object is only instantiated in Enhanced mode."

::= { t11ZsActiveZoneEntry 3 }

t11ZsActiveHardZoning OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates whether hard Zoning is
enabled on this Zone."

```

        This object is only instantiated in Enhanced mode."
 ::= { t11ZsActiveZoneEntry 4 }

--
-- Zone Members in the Active/Enforced Zone Set
--

t11ZsActiveZoneMemberTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF T11ZsActiveZoneMemberEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This table contains all members of all Zones
         within the active Zone Set on any fabric."
    ::= { t11ZsConfiguration 12 }

t11ZsActiveZoneMemberEntry OBJECT-TYPE
    SYNTAX          T11ZsActiveZoneMemberEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Each entry represents a member of a Zone in the active
         Zone Set of a particular fabric (identified by the value
         t11ZsServerFabricIndex), according to a particular
         switch (identified by values of fcmInstanceIndex and
         fcmSwitchIndex)."
```

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11ZsServerFabricIndex,
t11ZsActiveZoneIndex, t11ZsActiveZoneMemberIndex }

```

 ::= { t11ZsActiveZoneMemberTable 1 }

T11ZsActiveZoneMemberEntry ::= SEQUENCE {
    t11ZsActiveZoneMemberIndex      Unsigned32,
    t11ZsActiveZoneMemberFormat     T11ZsZoneMemberType,
    t11ZsActiveZoneMemberID         OCTET STRING
}

t11ZsActiveZoneMemberIndex OBJECT-TYPE
    SYNTAX          Unsigned32 (1..4294967295)
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "An index value which uniquely identifies this
         member amongst the members of a particular Zone
         in the active Zone Set on a particular fabric."
```

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```
::= { t11ZsActiveZoneMemberEntry 1 }
```

```
t11ZsActiveZoneMemberFormat OBJECT-TYPE
```

```
SYNTAX      T11ZsZoneMemberType
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "This object identifies the identifier format of the  
    corresponding instance of t11ZsActiveZoneMemberID."
```

```
::= { t11ZsActiveZoneMemberEntry 2 }
```

```
t11ZsActiveZoneMemberID OBJECT-TYPE
```

```
SYNTAX      OCTET STRING (SIZE (1..255))
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "This value of this object identifies the member  
    using the format specified in the corresponding  
    instance of t11ZsActiveZoneMemberFormat."
```

```
::= { t11ZsActiveZoneMemberEntry 3 }
```

```
--
```

```
-- Zone Attributes in the Active/Enforced Zone Set
```

```
--
```

```
t11ZsActiveAttribTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF T11ZsActiveAttribEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "This table contains information about some of the  
    Attributes of the Zones within the active Zone Set  
    on each fabric.
```

```
    This table contains all the types of attributes  
    which might apply zero, one, or more times to a Zone.  
    Attributes which apply once and only to a Zone are  
    specified in the t11ZsActiveZoneTable.
```

```
    This table will always be empty in Basic mode.  
    It will also be empty if there are no Zones in  
    any active Zone Set having any of the applicable  
    types of attributes."
```

::= { t11ZsConfiguration 13 }

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t11ZsActiveAttribEntry OBJECT-TYPE

SYNTAX T11ZsActiveAttribEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry contains an Attribute of a particular Zone in the active Zone Set of a particular fabric (identified by the value of t11ZsServerFabricIndex), according to a particular switch (identified by values of fcmInstanceIndex and fcmSwitchIndex)."

INDEX { fcmInstanceIndex, fcmSwitchIndex,
t11ZsServerFabricIndex,
t11ZsActiveZoneIndex, t11ZsActiveAttribIndex }

::= { t11ZsActiveAttribTable 1 }

T11ZsActiveAttribEntry ::= SEQUENCE {

t11ZsActiveAttribIndex Unsigned32,

t11ZsActiveAttribType Unsigned32,

t11ZsActiveAttribValue OCTET STRING

}

t11ZsActiveAttribIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An index value which uniquely identifies this attribute amongst the other attributes for a particular Zone in the active Zone Set on a particular fabric."

::= { t11ZsActiveAttribEntry 1 }

t11ZsActiveAttribType OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The type of attribute:

0001 - Protocol
00E0 (hex) - Vendor Specific

Note that type 2 (Hard) and type 3 (Broadcast)
do not need to be represented here, because they
are represented by t11ZsActiveBroadcast and

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t11ZsActiveHardZoning."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.8.3.8](#), table 267."

::= { t11ZsActiveAttribEntry 2 }

t11ZsActiveAttribValue OBJECT-TYPE

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

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of the attribute, formatted according to
its type as indicated by the corresponding instance
of t11ZsActiveAttribType.

As specified in FC-GS-5, the length of an attribute
value is at least 4 bytes, and if necessary, the value
is appended with zero bytes so that the length is a
multiple of four. For a Vendor Specific attribute
value, the first 8 bytes contains the T10 Vendor ID
as described in FC-GS-5."

REFERENCE

"ANSI INCITS xxx/200x, T11/Project 1677-D/Rev 8.2,
Fibre Channel - Generic Services-5 (FC-GS-5),
4 October 2005, [section 6.4.8.3.8](#), tables 268 & 269."

::= { t11ZsActiveAttribEntry 3 }

--

-- Zone Server Statistics

--

```

t11ZsStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11ZsStatsEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "A table of statistics maintained by Zone Servers."
    ::= { t11ZsStatistics 1 }

```

```

t11ZsStatsEntry OBJECT-TYPE
    SYNTAX      T11ZsStatsEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION

```

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```

        "A set of statistics for a Zone Server on a
        particular fabric (identified by the value of
        t11ZsServerFabricIndex) on a particular switch
        (identified by values of fcmInstanceIndex and
        fcmSwitchIndex)."
```

```

INDEX      { fcmInstanceIndex, fcmSwitchIndex,
              t11ZsServerFabricIndex }
::= { t11ZsStatsTable 1 }

```

```

T11ZsStatsEntry ::= SEQUENCE {
    t11ZsOutMergeRequests      Counter32,
    t11ZsInMergeAccepts       Counter32,
    t11ZsInMergeRequests      Counter32,
    t11ZsOutMergeAccepts      Counter32,
    t11ZsOutChangeRequests    Counter32,
    t11ZsInChangeAccepts      Counter32,
    t11ZsInChangeRequests     Counter32,
    t11ZsOutChangeAccepts     Counter32,
    t11ZsInZsRequests          Counter32,
    t11ZsOutZsRejects          Counter32
}

```

```

t11ZsOutMergeRequests OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only

```


STATUS current
DESCRIPTION
 "The number of Merge Request Frames sent by this Zone
 Server to other Zone Servers in the same fabric.

 This counter has no discontinuities other than those
 which all Counter32's have when sysUpTime=0."

::= { t11ZsStatsEntry 1 }

t11ZsInMergeAccepts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

 "The number of Merge Accept Frames received by this Zone
 Server from other Zone Servers in the same fabric.

 This counter has no discontinuities other than those
 which all Counter32's have when sysUpTime=0."

::= { t11ZsStatsEntry 2 }

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t11ZsInMergeRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

 "The number of Merge Request Frames received by this Zone
 Server from other Zone Servers in the same fabric.

 This counter has no discontinuities other than those
 which all Counter32's have when sysUpTime=0."

::= { t11ZsStatsEntry 3 }

t11ZsOutMergeAccepts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

 "The number of Merge Accept Frames sent by this Zone
 Server to other Zone Servers in the same fabric.

This counter has no discontinuities other than those
which all Counter32's have when sysUpTime=0."
 ::= { t11ZsStatsEntry 4 }

t11ZsOutChangeRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of change requests sent (via the Fabric Management Session Protocol) by this Zone Server to other Zone Servers in the same fabric.

This includes Acquire Change Authorization requests, Stage Fabric Config Update requests, Update Fabric Config requests and Release Change Authorization requests. It also includes the corresponding types of requests defined by the Enhanced Commit Service.

This counter has no discontinuities other than those
which all Counter32's have when sysUpTime=0."

REFERENCE

"Fibre Channel - Switch Fabric - 4 (FC-SW-4), Rev 7.6,
November 2005, sections [10.6](#) and [13](#)."

::= { t11ZsStatsEntry 5 }

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t11ZsInChangeAccepts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of SW_ACC messages received from other Zone Servers in the same fabric (according to the Fabric Management Session Protocol) in response to change requests by this Zone Server.

This includes SW_ACC messages received in response to Acquire Change Authorization requests, to Stage Fabric Config Update requests, to Update Fabric Config requests

and to Release Change Authorization requests. It also includes responses to the corresponding types of requests defined for the Enhanced Commit Service.

This counter has no discontinuities other than those which all Counter32's have when sysUpTime=0."

REFERENCE

"Fibre Channel - Switch Fabric - 4 (FC-SW-4), Rev 7.6, November 2005, sections [10.6](#) and [13](#)."

::= { t11ZsStatsEntry 6 }

t11ZsInChangeRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of change requests received (via the Fabric Management Session Protocol) by this Zone Server from other Zone Servers in the same fabric.

This includes Acquire Change Authorization requests, Stage Fabric Config Update requests, Update Fabric Config requests and Release Change Authorization requests. It also includes the corresponding types of requests defined by the Enhanced Commit Service.

This counter has no discontinuities other than those which all Counter32's have when sysUpTime=0."

REFERENCE

"Fibre Channel - Switch Fabric - 4 (FC-SW-4), Rev 7.6, November 2005, sections [10.6](#) and [13](#)."

::= { t11ZsStatsEntry 7 }

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t11ZsOutChangeAccepts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of SW_ACC messages sent by this Zone Server (according to the Fabric Management Session Protocol) in

response to change requests from other Zone Servers in the same fabric.

This includes SW_ACC messages sent in response to Acquire Change Authorization requests, to Stage Fabric Config Update requests, to Update Fabric Config requests and to Release Change Authorization requests. It also includes responses to the corresponding types of requests defined for the Enhanced Commit Service.

This counter has no discontinuities other than those which all Counter32's have when sysUpTime=0."

REFERENCE

"Fibre Channel - Switch Fabric - 4 (FC-SW-4), Rev 7.6, November 2005, sections [10.6](#) and [13](#)."

::= { t11ZsStatsEntry 8 }

t11ZsInZsRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Zone Server requests received by this Zone Server on this fabric, both those received in Basic mode and those received in Enhanced mode.

This counter has no discontinuities other than those which all Counter32's have when sysUpTime=0."

::= { t11ZsStatsEntry 9 }

t11ZsOutZsRejects OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Zone Server requests rejected by this Zone Server on this fabric, both those rejected in Basic mode and those rejected in Enhanced mode.

This counter has no discontinuities other than those

```

        which all Counter32's have when sysUpTime=0."
 ::= { t11ZsStatsEntry 10 }

--
-- Notification Control Table
--

t11ZsNotifyControlTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF T11ZsNotifyControlEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "A table of control information for notifications
        generated due to Zone Server events."
    ::= { t11ZsConfiguration 14 }

t11ZsNotifyControlEntry OBJECT-TYPE
    SYNTAX      T11ZsNotifyControlEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "Each entry contains notification control information
        specific to a Zone Server for a particular fabric
        (identified by the value of t11ZsServerFabricIndex)
        on a particular switch (identified by values of
        fcmInstanceIndex and fcmSwitchIndex)."
```

INDEX	{ fcmInstanceIndex, fcmSwitchIndex, t11ZsServerFabricIndex }
-------	---

```

    ::= { t11ZsNotifyControlTable 1 }

T11ZsNotifyControlEntry ::= SEQUENCE {
    t11ZsNotifyRequestRejectEnable    TruthValue,
    t11ZsNotifyMergeFailureEnable     TruthValue,
    t11ZsNotifyMergeSuccessEnable     TruthValue,
    t11ZsNotifyDefZoneChangeEnable    TruthValue,
    t11ZsNotifyActivateEnable         TruthValue,
    t11ZsRejectCtCommandString        OCTET STRING,
    t11ZsRejectRequestSource           FcNameIdOrZero,
    t11ZsRejectReasonCode              T11NsGs4RejectReasonCode,
    t11ZsRejectReasonCodeExp          T11ZsRejectReasonExplanation,
    t11ZsRejectReasonVendorCode       OCTET STRING
}
```

```

t11ZsNotifyRequestRejectEnable OBJECT-TYPE

```

SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "This object specifies whether t11ZsRequestRejectNotify
 notifications should be generated by the Zone Server
 for this fabric."
::= { t11ZsNotifyControlEntry 1 }

t11ZsNotifyMergeFailureEnable OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "This object specifies whether t11ZsMergeFailureNotify
 notifications should be generated by the Zone Server
 for this fabric."
::= { t11ZsNotifyControlEntry 2 }

t11ZsNotifyMergeSuccessEnable OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "This object specifies whether t11ZsMergeSuccessNotify
 notifications should be generated by the Zone Server
 for this fabric."
::= { t11ZsNotifyControlEntry 3 }

t11ZsNotifyDefZoneChangeEnable OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "This object specifies whether t11ZsDefZoneChangeNotify
 notifications should be generated by the Zone Server
 for this fabric."
::= { t11ZsNotifyControlEntry 4 }

t11ZsNotifyActivateEnable OBJECT-TYPE

SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "This object specifies whether t11ZsActivateNotify

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notifications should be generated by the Zone Server
for this fabric."

::= { t11ZsNotifyControlEntry 5 }

t11ZsRejectCtCommandString OBJECT-TYPE

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

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The binary content of the Zone 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
Zone 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)."

::= { t11ZsNotifyControlEntry 6 }

t11ZsRejectRequestSource 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
t11ZsRejectCtCommandString."

::= { t11ZsNotifyControlEntry 7 }

t11ZsRejectReasonCode OBJECT-TYPE

SYNTAX T11NsGs4RejectReasonCode

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The reason code corresponding to the most recent
rejection of a request by the Zone Server for

```
        this fabric."
 ::= { t11ZsNotifyControlEntry 8 }
```

t11ZsRejectReasonCodeExp OBJECT-TYPE

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```
SYNTAX      T11ZsRejectReasonExplanation
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "When the value of t11ZsRejectReasonCode is
    'Unable to perform command request', this
    object contains the corresponding reason code
    explanation."
 ::= { t11ZsNotifyControlEntry 9 }
```

```
t11ZsRejectReasonVendorCode      OBJECT-TYPE
SYNTAX      OCTET STRING (SIZE (1))
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "When the value of t11ZsRejectReasonCode is
    'Vendor Specific Error', this object contains
    the corresponding vendor-specific reason code."
 ::= { t11ZsNotifyControlEntry 10 }
```

```
t11ZsFabricIndex OBJECT-TYPE
SYNTAX      Unsigned32 (0..4096)
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "This object contains either a value of
    T11FabricIndex to identify the fabric on which
    some occurrence has caused a notification to be
    generated, or it has the value 4096 to indicate
    all applicable fabrics."
 ::= { t11ZsConfiguration 15 }
```

-- Notifications

t11ZsRequestRejectNotify NOTIFICATION-TYPE


```

OBJECTS      { t11FamLocalSwitchWwn,
                t11ZsRejectRequestSource,
                t11ZsRejectCtCommandString,
                t11ZsRejectReasonCode,
                t11ZsRejectReasonCodeExp,
                t11ZsRejectReasonVendorCode }
STATUS       current
DESCRIPTION   "This notification is generated whenever a Zone Server
                (indicated by the value of t11FamLocalSwitchWwn) rejects

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a request.

The value of t11ZsRejectCtCommandString indicates the rejected request, and the values of t11ZsRejectReasonCode, t11ZsRejectReasonCodeExp and t11ZsRejectReasonVendorCode indicate the reason for the rejection. The value of t11ZsRequestClient indicates the source of the request."

```
 ::= { t11ZsMIBNotifications 1 }
```

t11ZsMergeFailureNotify NOTIFICATION-TYPE

```
OBJECTS      { ifIndex, t11ZsFabricIndex }
```

```
STATUS       current
```

```
DESCRIPTION
```

"This notification indicates that a Zone merge failure has occurred on the fabric indicated by the value of t11ZsFabricIndex, on the interface indicated by the value of ifIndex.

If multiple Virtual Fabrics are configured on an interface, and all have a Zone merge failure at the same time, then just one notification is generated and t11ZsFabricIndex has the value 4096."

```
 ::= { t11ZsMIBNotifications 2 }
```

t11ZsMergeSuccessNotify NOTIFICATION-TYPE

```
OBJECTS      { ifIndex, t11ZsFabricIndex }
```

```
STATUS       current
```

```
DESCRIPTION
```

"This notification indicates that a successful Zone

merge has occurred on the fabric indicated by the value of t11ZsFabricIndex, on the interface indicated by the value of ifIndex.

If multiple Virtual Fabrics are configured on an interface, and all have a successful Zone Merge at the same time, then just one notification is generated and t11ZsFabricIndex has the value 4096."

::= { t11ZsMIBNotifications 3 }

t11ZsDefZoneChangeNotify NOTIFICATION-TYPE

OBJECTS { t11ZsServerDefaultZoneSetting }

STATUS current

DESCRIPTION

"This notification indicates that the value of a Default Zone Setting has changed.

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The value of t11ZsServerDefaultZoneSetting contains the value after the change."

::= { t11ZsMIBNotifications 4 }

t11ZsActivateNotify NOTIFICATION-TYPE

OBJECTS { t11FamLocalSwitchWwn, t11ZsActivateResult }

STATUS current

DESCRIPTION

"This notification is generated whenever a switch (indicated by the value of t11FamLocalSwitchWwn) activates/deactivates a Zone Set on a fabric. The t11ZsActivateResult object denotes the outcome of the activation/deactivation."

::= { t11ZsMIBNotifications 5 }

-- Conformance

t11ZsMIBCompliances OBJECT IDENTIFIER ::= { t11ZsMIBConformance 1 }

t11ZsMIBGroups OBJECT IDENTIFIER ::= { t11ZsMIBConformance 2 }

t11ZsMIBCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for entities which implement the Zone Server."

MODULE MANDATORY-GROUPS {t11ZsBasicGroup,
t11ZsNotificationControlGroup,
t11ZsNotificationGroup }

GROUP t11ZsEnhancedModeGroup

DESCRIPTION
"This group is mandatory only for those systems with Zone Servers which support Enhanced Mode."

GROUP t11ZsActivateGroup

DESCRIPTION
"Only entities that provide write access for activating a Zone Set support need to support this group."

GROUP t11ZsStatisticsGroup

DESCRIPTION
"These counters, containing Zone Server statistics, are mandatory only for those systems which count such events."

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OBJECT t11ZsSetRowStatus

SYNTAX INTEGER { active(1) }

MIN-ACCESS read-only

DESCRIPTION
"Write access is not required."

OBJECT t11ZsZoneRowStatus

SYNTAX INTEGER { active(1) }

MIN-ACCESS read-only

DESCRIPTION
"Write access is not required."

OBJECT t11ZsSetZoneRowStatus

SYNTAX INTEGER { active(1) }

MIN-ACCESS read-only

DESCRIPTION
"Write access is not required."

OBJECT t11ZsAliasRowStatus
SYNTAX INTEGER { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsZoneMemberRowStatus
SYNTAX INTEGER { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsAttribBlockRowStatus
SYNTAX INTEGER { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsAttribRowStatus
SYNTAX INTEGER { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerDatabaseStorageType
MIN-ACCESS read-only
DESCRIPTION

 "Write access is not required."

OBJECT t11ZsServerDistribute
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerCommit
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerReadFromDatabase
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerOperationMode
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerDefaultZoneSetting
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerMergeControlSetting
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsServerDefZoneBroadcast
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsSetName
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsZoneName
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsZoneAttribBlock
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsAliasName
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsZoneMemberFormat
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsZoneMemberID
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsAttribBlockName
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsAttribType
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsAttribValue
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsActivateRequest
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT t11ZsActivateDeactivate
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsNotifyRequestRejectEnable
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsNotifyMergeFailureEnable
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsNotifyMergeSuccessEnable
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsNotifyDefZoneChangeEnable
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT t11ZsNotifyActivateEnable
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

::= { t11ZsMIBCompliances 1 }

-- Units of Conformance

t11ZsBasicGroup OBJECT-GROUP

OBJECTS { t11ZsServerCapabilityObject,
 t11ZsServerDatabaseStorageType,
 t11ZsServerDistribute,
 t11ZsServerResult,
 t11ZsServerReasonCode,
 t11ZsServerReasonCodeExp,
 t11ZsServerReasonVendorCode,
 t11ZsServerLastChange,
 t11ZsServerHardZoning,
 t11ZsServerReadFromDatabase,
 t11ZsServerOperationMode,
 t11ZsSetName,
 t11ZsSetRowStatus,

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```
        t11ZsZoneName,
        t11ZsZoneAttribBlock,
        t11ZsZoneRowStatus,
        t11ZsSetZoneRowStatus,
        t11ZsZoneMemberFormat,
        t11ZsZoneMemberID,
        t11ZsZoneMemberRowStatus,
        t11ZsActiveZoneSetName,
        t11ZsActiveActivateTime,
        t11ZsActiveZoneName,
        t11ZsActiveZoneMemberFormat,
        t11ZsActiveZoneMemberID
    }
STATUS    current
DESCRIPTION
    "A collection of objects for displaying and updating
    the Zone configuration of a Zone Server capable of
    operating in Basic mode."
 ::= { t11ZsMIBGroups 1 }

t11ZsEnhancedModeGroup OBJECT-GROUP
    OBJECTS { t11ZsServerCommit,
        t11ZsServerChangeModeResult,
        t11ZsServerDefaultZoneSetting,
        t11ZsServerMergeControlSetting,
        t11ZsServerDefZoneBroadcast,
        t11ZsAliasName,
        t11ZsAliasRowStatus,
        t11ZsAttribBlockName,
        t11ZsAttribBlockRowStatus,
        t11ZsAttribType,
        t11ZsAttribValue,
        t11ZsAttribRowStatus,
        t11ZsActiveBroadcast,
        t11ZsActiveHardZoning,
        t11ZsActiveAttribType,
        t11ZsActiveAttribValue
    }
STATUS    current
DESCRIPTION
    "A collection of additional objects for displaying
    and updating the Zone configuration of a Zone Server
    capable of operating in Enhanced mode."
```


::= { t11ZsMIBGroups 2 }

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t11ZsStatisticsGroup OBJECT-GROUP

```
OBJECTS { t11ZsOutMergeRequests,
          t11ZsInMergeAccepts,
          t11ZsInMergeRequests,
          t11ZsOutMergeAccepts,
          t11ZsOutChangeRequests,
          t11ZsInChangeAccepts,
          t11ZsInChangeRequests,
          t11ZsOutChangeAccepts,
          t11ZsInZsRequests,
          t11ZsOutZsRejects
        }
```

STATUS current

DESCRIPTION

"A collection of objects for collecting Zone Server statistics information."

::= { t11ZsMIBGroups 3 }

t11ZsNotificationControlGroup OBJECT-GROUP

```
OBJECTS { t11ZsNotifyRequestRejectEnable,
          t11ZsNotifyMergeFailureEnable,
          t11ZsNotifyMergeSuccessEnable,
          t11ZsNotifyDefZoneChangeEnable,
          t11ZsNotifyActivateEnable,
          t11ZsRejectCtCommandString,
          t11ZsRejectRequestSource,
          t11ZsRejectReasonCode,
          t11ZsRejectReasonCodeExp,
          t11ZsRejectReasonVendorCode,
          t11ZsFabricIndex
        }
```

STATUS current

DESCRIPTION

"A collection of notification control and notification information objects for monitoring Zone Server request rejection and Zone merge failures."

```
::= { t11ZsMIBGroups 4 }
```

```
t11ZsActivateGroup OBJECT-GROUP
```

```
OBJECTS { t11ZsActivateRequest,  
          t11ZsActivateDeactivate,  
          t11ZsActivateResult,  
          t11ZsActivateFailCause,  
          t11ZsActivateFailDomainId
```

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```
    }  
    STATUS    current  
    DESCRIPTION  
        "A collection of objects which allow a Zone Set to  
        be activated via SNMP SetRequests and provide the  
        status and result of such an activation."  
    ::= { t11ZsMIBGroups 5 }
```

```
t11ZsNotificationGroup NOTIFICATION-GROUP
```

```
NOTIFICATIONS { t11ZsRequestRejectNotify,  
                t11ZsMergeFailureNotify,  
                t11ZsMergeSuccessNotify,  
                t11ZsDefZoneChangeNotify,  
                t11ZsActivateNotify }
```

```
STATUS        current  
DESCRIPTION
```

```
    "A collection of notification(s) for monitoring  
    Zone Server request rejection, Zone merge  
    failures and successes and Default Zoning  
    behavioural changes."  
    ::= { t11ZsMIBGroups 6 }
```

END

8. Intellectual Property

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Director."

[9.](#) 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 T11.5 members.

[10.](#) Normative References

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"Fibre-Channel Name Server MIB", Internet-Draft ([draft-ietf-imss-fc-nsm-mib-nn.txt](#)), work-in-progress.

11. Informative References

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[RFC3410]

Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and Applicability Statements for Internet- Standard Management Framework", [RFC 3410](#), December 2002.

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"Fibre Channel - Framing and Signaling (FC-FS)" ANSI INCITS 373-2003, April 2003.

12. IANA Considerations

IANA is requested to make two MIB OID assignments, one for the T11-FC-ZONE-SERVER-MIB module, and one for the T11-FC-FABRIC-LOCK-MIB

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module, under the appropriate subtree(s).

13. Security Considerations

There are many management objects defined in these MIB modules 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.

Specifically, unauthorized write access to *any* of the writable objects in these MIB modules could cause unauthorized manipulation of the Zoning information on a Zone Server, and/or the activation of an

unauthorized Active Zone Set in a fabric. This could result in allowing unauthorized connectivity, and/or denying authorized connectivity, between hosts connected to the Fibre Channel network.

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.

Unauthorized read access to any of the readable objects in the t11ZsServerTable, t11ZsActiveZoneTable, t11ZsActiveZoneMemberTable, or t11ZsActiveAttribTable tables would reveal information about the currently authorized connectivity between hosts connected to the Fibre Channel network.

Unauthorized read access to any of the readable objects in the t11ZsSetTable, t11ZsZoneTable, t11ZsSetZoneTable, t11ZsAliasTable, t11ZsZoneMemberTable, t11ZsAttribBlockTable or t11ZsAttribTable tables would reveal information about potential/alternative connectivity which could be authorized between hosts connected to the Fibre Channel network.

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.

14. Authors' Addresses

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