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1.1. Copyright Notice

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2. Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in TCP/IP based internets.
In particular it defines objects for managing a client using the iSCSI (SCSI over TCP) protocol. It is meant to match the latest version of iSCSI defined in [ISCSI].

3. Acknowledgments

In addition to the authors, several people contributed to the development of this MIB. Thanks especially to those who took the time to participate in our weekly conference calls to build our requirements, object models, table structures, and attributes: John Hufferd, Tom McSweeney (IBM), Kevin Gibbons (Nishan Systems), Chad Gregory (Intel), Jack Harwood (EMC), Hari Mudaliar (Adaptec), Ie Wei Njoo (Agilent), Lawrence Lamers (SAN Valley), Satish Mali (Stonefly Networks), and William Terrell (Troika).

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4. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in RFC 2571 [RFC2571].

- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIv1 and described in STD 16, RFC 1155 [RFC1155], STD 16, RFC 1212 [RFC1212] and RFC 1215 [RFC1215]. The second version, called SMIv2, is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

- Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, RFC 1157 [RFC1157]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [RFC1901] and RFC 1906 [RFC1906]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [RFC1906], RFC 2572 [RFC2572] and RFC 2574 [RFC2574].

- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [RFC1157]. A second set of...
protocol operations and associated PDU formats is described in RFC 1905 [RFC1905].

- A set of fundamental applications described in RFC 2573 [RFC2573] and the view-based access control mechanism described in RFC 2575 [RFC2575].

A more detailed introduction to the current SNMP Management Framework can be found in RFC 2570 [RFC2570].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIv2. A MIB conforming to the SMIv1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIv2 will be converted into textual descriptions in SMIv1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

5. Discussion

This MIB structure is intended to satisfy fault, performance, and security management for an iSCSI implementation. It is structured around the well-known iSCSI objects, such as targets, initiators, sessions, connections, and the like.

It is worthwhile to note that this is an iSCSI MIB and and such reflects only iSCSI objects (real or virtual). This means that this MIB will not directly deal with real SCSI objects or the SCSI protocol in general. This should be dealt with in a SCSI MIB if such a beast exists. The iSCSI tables that would likely have parallel objects in a SCSI MIB contain a RowPointer, which can be used to point to the corresponding object in a standard or proprietary SCSI MIB.

The iSCSI MIB consists of eight objects, each of which is represented by several different tables. This section contains a brief description of the "object" hierarchy and a description of each object, followed by a discussion of the actual SNMP table structure within the objects.
5.1. Overall MIB structure

The top-level object in this structure is the iSCSI instance, which contains all of the other objects.

iscsiInstance
-- A distinct iSCSI entity within the managed system.
-- Most implementations will have just one of these.
-- Stats are included instance level for errors which cause session termination.

iscsiTargetPortal
-- An IP Address and TCP Port pair on which this instance is listening for connections to its targets.
-- No statistics are included at this level.

iscsiInitiatorPortal
-- An IP Address from which this instance can make connections to other targets.
-- No statistics are included at this level.

iscsiSession
-- An active iSCSI session between an initiator and a target.
-- The session’s direction may be Inbound (outside initiator to our target) or Outbound (our initiator to an outside target).
-- Statistics at this level are performance-related.

iscsiConnection
-- An active TCP connection within an iSCSI session
-- No statistics appear here.

iscsiTarget
-- An iSCSI target to which this iSCSI instance is providing access.
-- Statistics relating to security and faults are included.

iscsiAccessList
-- A list of initiators that are allowed access to this target.
-- No statistics are included here.

iscsiInitiator
-- An iSCSI initiator, used by this iSCSI instance to access iSCSI targets.
-- Statistics relating to security and faults are included.

An Instance can contain Initiators, Targets, or both. Multiple InitiatorPortals and TargetPortals may be present; the MIB assumes that any Target may be accessed via any TargetPortal, although other access controls not reflected in the MIB might limit this.

Logical Units and LUNs are SCSI-level entities, which will be covered in a separate SCSI MIB.
5.2. MIB "object" structure

Each iSCSI "object" is comprised of several tables, which will make it easier to navigate the iSCSI MIB from a graphical browser, and to update the iSCSI MIB in the future.

Placing all of the indices, attributes, and statistics for each object in the same table would make the addition of new statistics and attributes appear messy. Since iSCSI is an evolving standard, it is worth having a few extra tables to make this easier. To this end, the attributes and statistics have been placed in separate tables, which augment the main indexed table for each object. Since there are several categories of statistics that will likely grow, most of the objects contain multiple statistics tables.

The following structure is used for all objects. Please do not be frightened; each of the objects includes only a few of these tables, as appropriate. Just replace the "*" in the following names with the iSCSI object name in which you are interested. For example, the Target object would be iscsiTargetInfo.

**iscsi*Info**

-- The main structure holding objects of a given type
iscsi*Objects
  -- sub-iscsi*Info structures go here
  -- Example: iscsiTargetInfo belongs under iscsiInstanceObjects
  -- and iscsiConnnectionInfo belongs under iscsiSessionObjects
iscsi*Scalars
  -- iscsi*Info scalars go here
iscsi*AttributesTable
  iscsi*AttributesEntry
    -- iscsi*Table index attributes
    -- iscsi*Entry non-statistical attributes
iscsi*StatsTable
  iscsi*StatsEntry
    -- Augments iscsiAttributes*Entry
    -- iscsi*Entry generic statistical attributes
    -- Contains performance-related counters
    -- Examples: Total requests, responses, data bytes
iscsi*SessionErrorStatsTable
  iscsi*SessionErrorStatsEntry
    -- Augments iscsiAttributes*Entry
    -- Connection statistics for errors that terminate sessions
    -- Used within Instance
    -- Examples: Digest, format, and connection timeout errors
iscsi*CxnErrorStatsTable
  iscsi*CxnErrorStatsEntry
    -- Augments iscsiAttributes*Entry
-- Connection error statistics
-- Used within Session
-- Examples: Digest and connection timeout errors
iscsi*LoginStatsTable
  iscsi*LoginStatsEntry
    -- Augments iscsiAttributes*Entry
    -- Numbers of successful and different types of
    -- unsuccessful logins
    -- Used by Target, Initiator
iscsi*LogoutStatsTable
  iscsi*TxLogoutStatsEntry
    -- Augments iscsiAttributes*Entry
    -- Numbers of normal and abnormal logouts
    -- Used by Target, Initiator

Note that this MIB does not attempt to count everything that could be
counted; it is designed to include only those counters that would be
useful for identifying performance, security, and fault problems from
a management station.

5.3. iscsiInstanceInfo

iscsiInstanceInfo is the primary table of the iSCSI MIB from which
all other tables are derived. It contains the
iscsiInstanceAttributesTable which lists all the known iSCSI
instances accessible by the agent.

One could envision that there might be just one instance (or row in
this table); however, it exists as a table to allow for multiple
virtual instances. For example, many IP routing products now allow
multiple virtual routers. The iSCSI MIB has the same premise.

Also, it is possible that for larger systems, a single SNMP agent may
control and monitor multiple subsystems, each of which have one or
even more instances.

A scalar predecessor of the table called the iscsiInstanceNumber
denotes the number of instances or rows in the
iscsiInstanceAttributesTable. Each row also contains similar "Number"
or instance counts for the various rows of the sub-tables that are
derived from this table. The term "endpoint" has been used to denote
either a target or initiator instance.

The instance attributes include information on the last target or
initiator at the other end of a session that caused a session
failure.

iscsiInstanceInfo also contains iscsiInstanceObjects, from which all
of the other tables are derived.

5.4. iscsiTargetPortalInfo

iscsiTargetPortalInfo is contained within iscsiInstanceObjects, and contains the iscsiTargetPortalAttributesTable.

The iscsiTargetPortalAttributesTable lists local sockets on which the iSCSI instance is listening for incoming connections to its targets. This table contains the local IP address, TCP (or other protocol) port, and IP protocol (for now, just TCP) on which the socket is listening. It also includes a portal group aggregation tag; iSCSI target ports within this instance sharing the same tag can contain connections within the same session.

This table will usually be empty for iSCSI instances that contain only initiators (such as iSCSI host driver implementations).

5.5. iscsiInitiatorPortalInfo

iscsiInitiatorPortalInfo is contained within iscsiInstanceObjects, and contains the iscsiInitiatorPortalAttributesTable.

The iscsiInitiatorPortalAttributesTable lists the IP addresses from which the iSCSI instance may initiate connections to other targets. Each entry in this table contains a local IP address and IP protocol (for now, just TCP), and a portal group aggregation tag, indicating which portals an initiator may use together within a multiple-connection session.

This table will usually be empty for iSCSI instances that contain only targets (such as most iSCSI devices).

5.6. iscsiSessionInfo

iscsiSessionInfo is contained within iscsiInstanceObjects, and contains the iscsiSessionAttributesTable.

The iscsiSessionAttributesTable contains a set of rows that list the sessions known to be existing locally for each iSCSI instance.

The session type for each session indicates whether the session is used for normal SCSI commands, for discovery using the SendTargets text command, or for other purposes such as booting an initiator.

The session direction for each session indicates whether it is an Inbound Session or an Outbound Session. Inbound sessions are from some other initiator to a target within this iSCSI instance; Outbound
sessions are from our initiator to a target outside this iSCSI instance.

An inbound session may be correlated with its local target using the TargetName attribute of the session; the InitiatorName indicates the "other end", in some other entity.

Similarly, an outbound session may be associated with its local initiator using the InitiatorName; in this case, the TargetName indicates the other end.

Many attributes may be negotiated when starting an iSCSI session. Most of these attributes are included in the session object.

Some attributes, such as the integrity and authentication schemes, have some standard values which can be extended by vendors to include their own schemes. Rather than using enumerated types for these, a UTF8String attribute is used to indicate the name of the scheme in use.

The iSCSI session includes statistics related to performance; counting iSCSI data bytes and PDUs. As most errors would result in the termination of an iSCSI session, error counters are kept for targets and initiators, rather than sessions.

iscsiSessionInfo also contains iscsiSessionObjects, from which the Connection table is derived.

5.7. iscsiConnectionInfo

iscsiConnectionInfo is contained within iscsiSessionObjects, and contains the iscsiConnectionAttributesTable.

The iscsiConnectionAttributesTable contains a list of active connections within each session. It contains the IP addresses and TCP (or other protocol) ports of both the local and remote side of the connection. These may be used to locate other connection-related information and statistics in the TCP MIB [RFC 2012].

The attributes table also contains a connection state. This state is not meant to directly map to the state tables included within the iSCSI specification; they are meant to be simplified, higher-level definitions of connection state that provide information more useful to a user or network manager.

No statistics are currently kept for each connection.
5.8. iscsiTargetInfo

iscsiTargetInfo is contained within iscsiInstanceObjects, and contains the iscsiTargetAttributesTable.

The iscsiTargetAttributesTable contains a list of iSCSI targets which may be accessed through the iSCSI instance. This table contains the target’s iSCSI Name, alias string, and some attributes used to indicate the last failure that was (or should have been) sent as a notification or trap. Also included is a RowPointer which can be used to locate the associated SCSI target object, should a SCSI MIB be created.

Statistics tables augmenting iscsiTargetAttributesTable are provided.

iscsiTargetInfo also contains iscsiTargetObjects, from which the AccessList tables are derived.

5.9. iscsiAccessListInfo

iscsiAccessListInfo is contained within iscsiTargetObjects, and contains the iscsiAccessListAttributesTable.

The iscsiAccessListAttributesTable contains an entry for each initiator that is allowed to access the target under which it appears. If a target allows access to any initiator, an AccessListAttributesEntry with the initiator’s iSCSI name should be used.

This table does not cover all possible access control schemes that a vendor could implement. If access to an initiator cannot be determined just by its iSCSI name, an implementation may use the canonical name "iscsi", or may choose to place no entries in this table.

No statistics are provided for access list entries.

5.10. iscsiInitiatorInfo

iscsiInitiatorInfo is contained within iscsiInstanceObjects, and contains the iscsiInitiatorAttributesTable.

The iscsiInitiatorAttributesTable contains a list of iSCSI initiators which are used by this iSCSI instance to access targets. Most implementations will include a single entry in this table, regardless of the number of physical interfaces the initiator may use. This table’s attributes include the initiator’s iSCSI name and alias string.
Statistics tables augmenting iscsiInitiatorAttributesTable are provided.

5.11. IP Addresses and TCP Port Numbers

The IP addresses in this MIB are represented by two attributes, one of type InetAddressType, and the other of type InetAddress. These are taken from [IPV6MIB], which is an update to [RFC2851] specifying how to support addresses that may be either IPv4 or IPv6.

The TCP port numbers that appear in a few of the structures are described as simply port numbers, with a protocol attribute indicating whether they are TCP ports, or something else. This will allow the MIB to be compatible with iSCSI over transports other than TCP in the future.

5.12. Notifications

Three notifications are provided. One is sent by an initiator detecting a critical login failure; another is sent by a target detecting a critical login failure, and the third is sent upon a session being terminated due to an abnormal connection or digest failure. Critical failures are defined as those that may expose security-related problems that may require immediate action, such as failures due to authentication, authorization, or negotiation problems. Attributes in the initiator, target, and instance objects provide the information necessary to send in the notification, such as the initiator or target name and IP address at the other end that may have caused the failure.
6. MIB Definitions

ISCSI-MIB DEFINITIONS ::= BEGIN

IMPORTS
MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
Unsigned32, Counter32, Counter64,
experimental
FROM SNMPv2-SMI

TEXTUAL-CONVENTION, TruthValue, VariablePointer, TimeStamp
FROM SNMPv2-TC

MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
FROM SNMPv2-CONF

-- These are from draft-ietf-ops-rfc2851-update-00.txt
-- You will have to work out the details with your own
-- compiler being because they are so new.
InetAddressType, InetAddress
FROM INET-ADDRESS-MIB
;

-- TBD
-- 1) need a For-Real number to attach to

iscsiModule MODULE-IDENTITY
    LAST-UPDATED                    "0104020000Z" -- April 2, 2001
    ORGANIZATION                    "Cisco Systems, Inc"
    CONTACT-INFO
        "
        Mark Bakke
        Postal: Cisco Systems, Inc
        6450 Wedgwood Road, Suite 130
        Maple Grove, MN
        USA 55311

        Tel: +1 763-398-1000
        Fax: +1 763-398-1001

        E-mail: mbakke@cisco.com

        Marjorie Krueger
        Postal: Hewlett-Packard
        Networked Storage Architecture
        Networked Storage Solutions Org.
DESCRIPTION

"Various changes, additions, deletions:
1) Extensive re-organization of Comformance area.
2) Removal of Lu & Lun groups
3) Addition of lots of DESCRIPTIONS... but still not enough."

REVISION "0102280000Z" -- February 28, 2001
DESCRIPTION
"Complete re-write, with the assistance of various persons in the iSCSI MIB working group."

REVISION "0007280000Z" -- July 28, 2000
DESCRIPTION
"Update to re-arrange the tables so that the initiator table is now an expansion table for the base iSCSI table.
Added a couple of additional variables, the targetLunNumber in the target table and the lunSerialNumber in the lun table.
Also a better definition of the OBJECT-GROUPs."

::= { experimental 1 }

iscsiObjects OBJECT IDENTIFIER ::= { iscsiModule 1 }
iscsiNotifications OBJECT IDENTIFIER ::= { iscsiModule 2 }
iscsiConformance OBJECT IDENTIFIER ::= { iscsiModule 3 }

-- Textual Conventions

Utf8String ::= TEXTUAL-CONVENTION
DISPLAY-HINT "255t"
STATUS current
DESCRIPTION " Represents textual information taken from the UTF-8 character set. Any object defined using this syntax may not exceed 255 characters in length."
SYNTAX OCTET STRING (SIZE (0..255))

-- OK, the various preliminaries are out of the way...

-- There is a single object from which all others are based
iscsiInstanceInfo OBJECT IDENTIFIER ::= { iscsiObjects 1 }

iscsiInstanceObjects OBJECT IDENTIFIER ::= { iscsiInstanceInfo 1 }
iscsiInstanceScalars OBJECT IDENTIFIER ::= { iscsiInstanceInfo 2 }

iscsiInstanceNumber OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of iSCSI instances monitored and/or managed by a single agent."
::= { iscsiInstanceScalars 1 }

-- Instance Attributes Table

iscsiInstanceAttributesTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiInstanceAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A list of iSCSI instances present on the system."
::= { iscsiInstanceInfo 3 }

iscsiInstanceAttributesEntry OBJECT-TYPE
SYNTAX IscsiInstanceAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (row) containing management information applicable
to a particular iSCSI instance."
INDEX { iscsiInstIndex }
 ::= { iscsiInstanceAttributesTable 1 }

IscsiInstanceAttributesEntry ::= SEQUENCE {
   iscsiInstIndex                 Unsigned32,
   iscsiInstName                  Utf8String,
   iscsiInstVersionMin            INTEGER,
   iscsiInstVersionMax            INTEGER,
   iscsiInstVendorID              Utf8String,
   iscsiInstVendorVersion         Utf8String,
   iscsiInstTargetPortalNumber    Unsigned32,
   iscsiInstInitiatorPortalNumber Unsigned32,
   iscsiInstSessionNumber         Unsigned32,
   iscsiInstTargetNumber          Unsigned32,
   iscsiInstInitiatorNumber       Unsigned32,
   iscsiInstNameServiceAddrType   InetAddressType,
   iscsiInstNameServiceAddr       InetAddress,
   iscsiInstNameServicePort       Unsigned32,
   iscsiInstNameServiceType       Utf8String,
   iscsiInstLastSsnFailureType    VariablePointer,
   iscsiInstLastSsnRmtNodeName    Utf8String
}

iscsiInstIndex OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
   "An arbitrary integer used to uniquely identify a particular
   iSCSI instance."
 ::= { iscsiInstanceAttributesEntry 1 }

iscsiInstName OBJECT-TYPE
SYNTAX Utf8String
MAX-ACCESS read-only
STATUS current
DESCRIPTION
   "A UTF-8 string, determined by the implementation to name the
   iSCSI instance. As most implementations only use a single
   instance, this may be left blank. Implementations that
   support multiple iSCSI instances may use this string in
   whatever manner they choose to describe the purpose of the
   instance to a user."
 ::= { iscsiInstanceAttributesEntry 2 }

iscsiInstVersionMin OBJECT-TYPE
SYNTAX INTEGER (0..255)
MAX-ACCESS                  read-only
STATUS                      current
DESCRIPTION
"Minimum version number of the iSCSI specification supported
by this instance."
::= { iscsiInstanceAttributesEntry 3 }

iscsiInstVersionMax OBJECT-TYPE
SYNTAX                         INTEGER (0..255)
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"Maximum version number of the iSCSI specification supported
by this instance."
::= { iscsiInstanceAttributesEntry 4 }

iscsiInstVendorID OBJECT-TYPE
SYNTAX                         Utf8String
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"A text string describing the manufacturer of this instance."
::= { iscsiInstanceAttributesEntry 5 }

iscsiInstVendorVersion OBJECT-TYPE
SYNTAX                         Utf8String
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"A text string set by the manufacturer describing the version
of this instance. The format of this string is determined
solely by the manufacturer, and is for informational purposes
only. It is unrelated to the iSCSI specification version
numbers."
::= { iscsiInstanceAttributesEntry 6 }

iscsiInstTargetPortalNumber OBJECT-TYPE
SYNTAX                         Unsigned32 (1..4294967295)
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"The number of TCP (or other transport) ports on which this
iSCSI instance is listening for connections to its targets."
::= { iscsiInstanceAttributesEntry 7 }

iscsiInstInitiatorPortalNumber OBJECT-TYPE
SYNTAX                         Unsigned32 (1..4294967295)
MAX-ACCESS                     read-only
STATUS current
DESCRIPTION "The number of TCP (or other transport) ports on which this iSCSI instance may initiate connections to targets."
::= { iscsiInstanceAttributesEntry 8 }

iscsiInstSessionNumber OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of sessions currently associated with this iSCSI instance."
::= { iscsiInstanceAttributesEntry 9 }

iscsiInstTargetNumber OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of targets currently associated with this iSCSI instance."
::= { iscsiInstanceAttributesEntry 10 }

iscsiInstInitiatorNumber OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of initiators currently associated with this iSCSI instance."
::= { iscsiInstanceAttributesEntry 11 }

iscsiInstNameServiceAddrType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The type of Inet address in the next object."
::= { iscsiInstanceAttributesEntry 12 }

iscsiInstNameServiceAddr OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The Inet Address of the name service being used, if there is one."
::= { iscsiInstanceAttributesEntry 13 }

Bakke, Muchow Expires January 2002 [Page 16]
iscsiInstNameServicePort OBJECT-TYPE
SYNTAX                Unsigned32 (0..65535)
MAX-ACCESS            read-write
STATUS                current
DESCRIPTION
 "The port of the name service being used, if there is one."
 ::= { iscsiInstanceAttributesEntry 14 }

iscsiInstNameServiceType OBJECT-TYPE
SYNTAX                Utf8String
MAX-ACCESS            read-write
STATUS                current
DESCRIPTION
 "The type of name service being used, if there is one. The
type string should represent a valid name service that conforms
to the iSCSI name service conventions."
 ::= { iscsiInstanceAttributesEntry 15 }

iscsiInstLastSsnFailureType OBJECT-TYPE
SYNTAX                VariablePointer
MAX-ACCESS            read-only
STATUS                current
DESCRIPTION
 "The exact counter instance in the iscsiInstSessionErrorStatsTable
that was incremented when the last session failure occurred."
 ::= { iscsiInstanceAttributesEntry 16 }

iscsiInstLastSsnRmtNodeName OBJECT-TYPE
SYNTAX                Utf8String
MAX-ACCESS            read-only
STATUS                current
DESCRIPTION
 "Name of the remote node from the failed session."
 ::= { iscsiInstanceAttributesEntry 17 }

-- Instance Session Failure Stats Table

iscsiInstanceSessionErrorStatsTable OBJECT-TYPE
SYNTAX                SEQUENCE OF IscsiInstanceSessionErrorStatsEntry
MAX-ACCESS            not-accessible
STATUS                current
DESCRIPTION
 "A list of iSCSI instances present on the system."
 ::= { iscsiInstanceInfo 4 }

iscsiInstanceSessionErrorStatsEntry OBJECT-TYPE
SYNTAX                IscsiInstanceSessionErrorStatsEntry
MAX-ACCESS            not-accessible

Bakke, Muchow           Expires January 2002
An entry (row) containing management information applicable to a particular iSCSI instance.

AUGMENTS { iscsiInstanceAttributesEntry }

::= { iscsiInstanceSessionErrorStatsTable 1 }

iscsiInstanceSessionErrorStatsEntry ::= SEQUENCE {
  iscsiInstSsnDigestErrors       Counter32,
  iscsiInstSsnCxnTimeoutErrors   Counter32,
  iscsiInstSsnFormatErrors       Counter32
}

iscsiInstSsnDigestErrors OBJECT-TYPE
SYNTAX                         Counter32
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
  "The count of sessions which were failed due to receipt of a PDU containing header or data digest errors."
::= { iscsiInstanceSessionErrorStatsEntry 1 }

iscsiInstSsnCxnTimeoutErrors OBJECT-TYPE
SYNTAX                         Counter32
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
  "The count of sessions which were failed due to a sequence exceeding a time limit."
::= { iscsiInstanceSessionErrorStatsEntry 2 }

iscsiInstSsnFormatErrors OBJECT-TYPE
SYNTAX                         Counter32
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
  "The count of sessions which were failed due to receipt of a PDU which contained a format error."
::= { iscsiInstanceSessionErrorStatsEntry 3 }

-----------------------------------------------

iscsiTargetPortalInfo OBJECT IDENTIFIER ::= { iscsiInstanceObjects 1 }

iscsiTargetPortalObjects OBJECT IDENTIFIER ::= { iscsiTargetPortalInfo 1 }
iscsiTargetPortalScalars OBJECT IDENTIFIER ::= { iscsiTargetPortalInfo 2 }

-- Target Portal Attributes Table
iscsiTargetPortalAttributesTable OBJECT-TYPE
SYNTAX          SEQUENCE OF IscsiTargetPortalAttributesEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
   "A list of sockets (using TCP or another transport protocol) on which this iSCSI instance listens for incoming connections to its targets."
::= { iscsiTargetPortalInfo 3 }

iscsiTargetPortalAttributesEntry OBJECT-TYPE
SYNTAX          IscsiTargetPortalAttributesEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
   "An entry (row) containing management information applicable to a particular target portal instance."
INDEX { iscsiInstIndex, iscsiTgtPortalIndex  }
::= { iscsiTargetPortalAttributesTable 1 }

IscsiTargetPortalAttributesEntry ::= SEQUENCE {
  iscsiTgtPortalIndex            Unsigned32,
  iscsiTgtPortalProtocol         INTEGER,
  iscsiTgtPortalAddrType         InetAddressType,
  iscsiTgtPortalAddr             InetAddress,
  iscsiTgtPortalPort             Unsigned32,
  iscsiTgtPortalTag              INTEGER
}

iscsiTgtPortalIndex OBJECT-TYPE
SYNTAX          Unsigned32 (1..4294967295)
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
   "An arbitrary integer used to uniquely identify a particular port (aka socket) instance within an iSCSI instance present on the node."
::= { iscsiTargetPortalAttributesEntry 1 }

iscsiTgtPortalProtocol OBJECT-TYPE
SYNTAX          INTEGER (1..255)
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
   "The portal’s transport protocol."
DEFVAL          { 6 } -- TCP
::= { iscsiTargetPortalAttributesEntry 2 }
iscsiTgtPortalAddrType OBJECT-TYPE  
SYNTAX InetAddressType  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION "The type of Inet address in the next object."  
::= { iscsiTargetPortalAttributesEntry 3 }

iscsiTgtPortalAddr OBJECT-TYPE  
SYNTAX InetAddress  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION "The portal’s Inet address."  
::= { iscsiTargetPortalAttributesEntry 4 }

iscsiTgtPortalPort OBJECT-TYPE  
SYNTAX Unsigned32 (1..65535)  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION "The portal’s port number."  
::= { iscsiTargetPortalAttributesEntry 5 }

iscsiTgtPortalTag OBJECT-TYPE  
SYNTAX INTEGER (1..65535)  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION "The portal’s aggregation tag. Multiple-connection sessions may be aggregated over portals sharing an identical aggregation tag."  
::= { iscsiTargetPortalAttributesEntry 6 }

-- Initiator Portal Attributes Table

iscsiInitiatorPortalInfo OCTET STRING ::= { iscsiInstanceObjects 2 }

iscsiInitiatorPortalObjects OBJECT IDENTIFIER ::= { iscsiInitiatorPortalInfo 1 }
iscsiInitiatorPortalScalars OBJECT IDENTIFIER ::= { iscsiInitiatorPortalInfo 2 }

-- Initiator Portal Attributes Table

iscsiInitiatorPortalAttributesTable OBJECT-TYPE  
SYNTAX SEQUENCE OF IscsiInitiatorPortalAttributesEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION
"A list of Inet addresses (using TCP or another transport protocol) from which this iSCSI instance may initiate connections to other targets."

::= { iscsiInitiatorPortalInfo 3 }

iscsiInitiatorPortalAttributesEntry OBJECT-TYPE
SYNTAX IscsiInitiatorPortalAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry (row) containing management information applicable to a particular initiator portal instance."
INDEX { iscsiInstIndex, iscsiIntrPortalIndex  }
::= { iscsiInitiatorPortalAttributesTable 1 }

IscsiInitiatorPortalAttributesEntry ::= SEQUENCE {
  iscsiIntrPortalIndex           Unsigned32,
  iscsiIntrPortalProtocol        INTEGER,
  iscsiIntrPortalAddrType        InetAddressType,
  iscsiIntrPortalAddr            InetAddress,
  iscsiIntrPortalTag             INTEGER
}

iscsiIntrPortalIndex OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An arbitrary integer used to uniquely identify a particular initiator portal instance within an iSCSI instance present on the node."
::= { iscsiInitiatorPortalAttributesEntry 1 }

iscsiIntrPortalProtocol OBJECT-TYPE
SYNTAX INTEGER (1..255)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The portal’s transport protocol."
DEFVAL { 6 } -- TCP
::= { iscsiInitiatorPortalAttributesEntry 2 }

iscsiIntrPortalAddrType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The type of Inet address in the next object."
::= { iscsiInitiatorPortalAttributesEntry 3 }

iscsiIntrPortalAddr OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The portal’s Inet address."
 ::= { iscsiInitiatorPortalAttributesEntry 4 }

iscsiIntrPortalTag OBJECT-TYPE
SYNTAX INTEGER (1..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The portal’s aggregation tag. Multiple-connection sessions may be aggregated over portals sharing an identical aggregation tag."
 ::= { iscsiInitiatorPortalAttributesEntry 6 }

iscsiSessionInfo OBJECT IDENTIFIER ::= { iscsiInstanceObjects 3 }

iscsiSessionObjects OBJECT IDENTIFIER ::= { iscsiSessionInfo 1 }
iscsiSessionScalars OBJECT IDENTIFIER ::= { iscsiSessionInfo 2 }

-- Session Attributes Table

iscsiSessionAttributesTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiSessionAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A list of Sessions belonging to each iSCSI instance present on the system."
 ::= { iscsiSessionInfo 3 }

iscsiSessionAttributesEntry OBJECT-TYPE
SYNTAX IscsiSessionAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (row) containing management information applicable to a particular Session instance."
INDEX { iscsiInstIndex, iscsiSsnIndex }
 ::= { iscsiSessionAttributesTable 1 }
IscsiSessionAttributesEntry ::= SEQUENCE {
    iscsiSsnIndex Unsigned32,
    iscsiSsnDirection INTEGER,
    iscsiSsnTargetName Utf8String,
    iscsiSsnTsId INTEGER,
    iscsiSsnInitiatorName Utf8String,
    iscsiSsnIsId INTEGER,
    iscsiSsnAlias Utf8String,
    iscsiSsnUseR2t TruthValue,
    iscsiSsnBidirectionalUseR2t TruthValue,
    iscsiSsnImmediateData TruthValue,
    iscsiSsnType INTEGER,
    iscsiSsnMaxOutstandingR2t INTEGER,
    iscsiSsnMaxDataPduLength INTEGER,
    iscsiSsnFirstBurstSize INTEGER,
    iscsiSsnConnectionNumber Unsigned32,
    iscsiSsnMaxConnections Unsigned32,
    iscsiSsnHeaderIntegrity Utf8String,
    iscsiSsnDataIntegrity Utf8String,
    iscsiSsnAuthMethod Utf8String,
    iscsiSsnCommandReplay TruthValue,
    iscsiSsnDataOrder TruthValue,
    iscsiSsnDataDeliveryOrder TruthValue
}

iscsiSsnIndex OBJECT-TYPE
SYNTAX Unsigned32 (1..4294967295)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An arbitrary integer used to uniquely identify a particular
Session instance within an iSCSI instance present on the node."
::= { iscsiSessionAttributesEntry 1 }

iscsiSsnDirection OBJECT-TYPE
SYNTAX INTEGER { inboundSession(1),
    outboundSession(2) }
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Direction of iSCSI session:
InboundSession - session is established from an external
initiator to a target within this iSCSI instance.
OutboundSession - session is established from an initiator
within this iSCSI instance to an external target."
::= { iscsiSessionAttributesEntry 2 }
iscsiSsnTargetName OBJECT-TYPE
SYNTAX          Utf8String
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "Name of the target, as described in iscsiTgtName."
::= { iscsiSessionAttributesEntry 3 }

iscsiSsnTsid OBJECT-TYPE
SYNTAX          INTEGER (1..65535)
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "The target-defined portion of the iSCSI Session ID."
::= { iscsiSessionAttributesEntry 4 }

iscsiSsnInitiatorName OBJECT-TYPE
SYNTAX          Utf8String
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "Name of the initiator, as described in iscsiIntrName."
::= { iscsiSessionAttributesEntry 5 }

iscsiSsnIsid OBJECT-TYPE
SYNTAX          INTEGER (1..65535)
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "The initiator-defined portion of the iSCSI Session ID."
::= { iscsiSessionAttributesEntry 6 }

iscsiSsnAlias OBJECT-TYPE
SYNTAX          Utf8String
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "The initiator or target alias communicated by the other end of the session during the login phase, if any."
::= { iscsiSessionAttributesEntry 7 }

iscsiSsnUseR2t OBJECT-TYPE
SYNTAX          TruthValue
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "Indicates whether the initiator and target have agreed to use the Ready To Transfer (R2T) protocol to control data flow"
Internet Draft         iSCSI MIB         July 2001

for Data PDUs flowing toward the target on this session."
::= { iscsiSessionAttributesEntry 8 }

iscsiSsnBidirectionalUseR2t OBJECT-TYPE
SYNTAX                         TruthValue
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"Indicates whether the initiator and target have agreed to use
the Ready To Transfer (R2T) protocol to control data flow
for the write portions of bidirectional commands on this session."
::= { iscsiSessionAttributesEntry 9 }

iscsiSsnImmediateData OBJECT-TYPE
SYNTAX                         TruthValue
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"Indicates whether the initiator and target have agreed to support
immediate commands on this session."
::= { iscsiSessionAttributesEntry 10 }

iscsiSsnType OBJECT-TYPE
SYNTAX                         INTEGER {
    normalSession(0),
    bootSession(1),
    discoverySession(2),
    copySession(3)
}
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"Type of iSCSI session:
    normalSession    - session is a normal iSCSI session
    bootSession      - session is being used to boot an initiator
    discoverySession - session is being used only for discovery
    copySession      - session is being used by a copy manager."
::= { iscsiSessionAttributesEntry 11 }

iscsiSsnMaxOutstandingR2t OBJECT-TYPE
SYNTAX                         INTEGER (1..65535)
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"The maximum number of outstanding request-to-transmit
(R2T)s per task within this session."
::= { iscsiSessionAttributesEntry 12 }
iscsiSsnMaxDataPduLength OBJECT-TYPE
SYNTAX INTEGER (1..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The maximum data payload size supported for command
or data PDUs within this session, in units of 512
bytes."
::= { iscsiSessionAttributesEntry 13 }

iscsiSsnFirstBurstSize OBJECT-TYPE
SYNTAX INTEGER (1..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The maximum length supported for unsolicited data sent
within this session, in units of 512 bytes."
::= { iscsiSessionAttributesEntry 14 }

iscsiSsnConnectionNumber OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of TCP connections that currently belong
to this session."
::= { iscsiSessionAttributesEntry 15 }

iscsiSsnMaxConnections OBJECT-TYPE
SYNTAX Unsigned32 (1..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The maximum number of connections that will be allowed
within this session."
::= { iscsiSessionAttributesEntry 16 }

iscsiSsnHeaderIntegrity OBJECT-TYPE
SYNTAX Utf8String
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The name of the iSCSI header digest scheme in use
within this session."
::= { iscsiSessionAttributesEntry 17 }

iscsiSsnDataIntegrity OBJECT-TYPE
SYNTAX Utf8String
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The name of the iSCSI data digest scheme in use within this session."
::= { iscsiSessionAttributesEntry 18 }

iscsiSsnAuthMethod OBJECT-TYPE
SYNTAX Utf8String
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The name of the authentication method being used on this session, as communicated during the login phase."
::= { iscsiSessionAttributesEntry 19 }

iscsiSsnCommandReplay OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION "If True, indicates that this session has command replay enabled."
::= { iscsiSessionAttributesEntry 20 }

iscsiSsnDataOrder OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION "False indicates that data PDU Sequences can be in any order. True indicates that data PDU Sequences have to be at continuously increasing addresses."
::= { iscsiSessionAttributesEntry 21 }

iscsiSsnDataDeliveryOrder OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION "False indicates that data PDUs can be in any order. True indicates that data PDUs have to be at continuously increasing addresses."
::= { iscsiSessionAttributesEntry 22 }

-- Session Stats Table
iscsiSessionStatsTable OBJECT-TYPE
   SYNTAX                   SEQUENCE OF IscsiSessionStatsEntry
   MAX-ACCESS              not-accessible
   STATUS                  current
   DESCRIPTION             "A list of iSCSI command/response PDU and octet data transfer counters for each of the Session instances present on the system."
   ::= { iscsiSessionInfo 4 }

iscsiSessionStatsEntry OBJECT-TYPE
   SYNTAX                   IscsiSessionStatsEntry
   MAX-ACCESS              not-accessible
   STATUS                  current
   DESCRIPTION             "An entry (row) containing iSCSI command/response PDU and octet data transfer counters for a particular Session instance."
   AUGMENTS { iscsiSessionAttributesEntry }
   ::= { iscsiSessionStatsTable 1 }

IscsiSessionStatsEntry ::= SEQUENCE {
   iscsiSsnCmdPdus                Counter32,
   iscsiSsnRspPdus                Counter32,
   iscsiSsnTxDataOctets           Counter64,
   iscsiSsnRxDataOctets           Counter64
}

iscsiSsnCmdPdus OBJECT-TYPE
   SYNTAX                   Counter32
   MAX-ACCESS              read-only
   STATUS                  current
   DESCRIPTION             "The count of Command PDUs that flowed on this session instance."
   ::= { iscsiSessionStatsEntry 1 }

iscsiSsnRspPdus OBJECT-TYPE
   SYNTAX                   Counter32
   MAX-ACCESS              read-only
   STATUS                  current
   DESCRIPTION             "The count of Response PDUs that flowed on this session instance."
   ::= { iscsiSessionStatsEntry 2 }

iscsiSsnTxDataOctets OBJECT-TYPE
   SYNTAX                   Counter64
   MAX-ACCESS              read-only
   STATUS                  current
   DESCRIPTION             "The count of data octets that were transmitted by
the local iSCSI node on this session instance.

::= { iscsiSessionStatsEntry 3 }

iscsiSsnRxDataOctets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of data octets that were received by
the local iSCSI node on this session instance."
::= { iscsiSessionStatsEntry 4 }

-- Session Connection Error Stats Table

iscsiSessionCxnErrorStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiSessionCxnErrorStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A list of PDU or timeout connection error counters for
each of the session instances present on this system."
::= { iscsiSessionInfo 5 }

iscsiSessionCxnErrorStatsEntry OBJECT-TYPE
SYNTAX IscsiSessionCxnErrorStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (row) containing PDU or time-out connection error
counters for a particular session instance."
AUGMENTS { iscsiSessionAttributesEntry }
::= { iscsiSessionCxnErrorStatsTable 1 }

IscsiSessionCxnErrorStatsEntry ::= SEQUENCE {
  iscsiSsnDigestErrors Counter32,
  iscsiSsnCxnTimeoutErrors Counter32
}

iscsiSsnDigestErrors OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of PDUs which the session instance received which
contained header or data digest errors."
::= { iscsiSessionCxnErrorStatsEntry 1 }

iscsiSsnCxnTimeoutErrors OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "This is the count of sequences which exceeded their time limit."
::= { iscsiSessionCxnErrorStatsEntry 2 }

iscsiConnectionInfo OBJECT IDENTIFIER ::= { iscsiSessionObjects 1 }

iscsiConnectionObjects OBJECT IDENTIFIER ::= { iscsiConnectionInfo 1 }
iscsiConnectionScalars OBJECT IDENTIFIER ::= { iscsiConnectionInfo 2 }

-- Connection Attributes Table
iscsiConnectionAttributesTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiConnectionAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A list of Connections belonging to each iSCSI instance present on the system."
::= { iscsiConnectionAttributesTable 1 }

IscsiConnectionAttributesEntry OBJECT-TYPE
SYNTAX IscsiConnectionAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (row) containing management information applicable to a particular Connection instance."
INDEX { iscsiInstIndex, iscsiSsnIndex, iscsiCxnIndex }
::= { iscsiConnectionAttributesTable 1 }

IscsiConnectionAttributesEntry ::= SEQUENCE {
  iscsiCxnIndex Unsigned32,
  iscsiCxnCid INTEGER32,
  iscsiCxnState INTEGER,
  iscsiCxnProtocol INTEGER,
  iscsiCxnLocalAddrType InetAddressType,
  iscsiCxnLocalAddr InetAddress,
  iscsiCxnLocalPort Unsigned32,
  iscsiCxnRemoteAddrType InetAddressType,
  iscsiCxnRemoteAddr InetAddress,
  iscsiCxnRemotePort Unsigned32
}
iscsiCxnIndex OBJECT-TYPE
SYNTAX                Unsigned32 (1..4294967295)
MAX-ACCESS            not-accessible
STATUS                current
DESCRIPTION           "An arbitrary integer used to uniquely identify a particular
                      Connection instance of a particular Session instance within an
                      iSCSI instance present on the node."
 ::= { iscsiConnectionAttributesEntry 1 }

iscsiCxnCid OBJECT-TYPE
SYNTAX                INTEGER (1..65535)
MAX-ACCESS            read-only
STATUS                current
DESCRIPTION           "The iSCSI Connection ID for this connection."
 ::= { iscsiConnectionAttributesEntry 2 }

iscsiCxnState OBJECT-TYPE
SYNTAX                INTEGER { login(0),
                                  negotiation(1),
                                  full(2),
                                  logout(3) }
MAX-ACCESS            read-only
STATUS                current
DESCRIPTION           "The current state of this connection, from an iSCSI negotiation
                      point of view. Here are the states:

                      login       - The TCP connection has been established, but a
                                  valid iSCSI login response with the final bit set
                                  has not been sent or received.

                      full        - A valid iSCSI login response with the final bit set
                                  has been sent or received.

                      logout      - A valid iSCSI logout command has been sent or
                                  received, but the TCP connection has not yet been
                                  closed."
 ::= { iscsiConnectionAttributesEntry 3 }

iscsiCxnProtocol OBJECT-TYPE
SYNTAX                INTEGER (1..255)
MAX-ACCESS            read-only
STATUS                current
DESCRIPTION           "The transport protocol over which this connection instance is
                      running."
DEFVAL { 6 } -- TCP ::= { iscsiConnectionAttributesEntry 4 }

iscsiCxnLocalAddrType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The type of Inet address in the next object."
 ::= { iscsiConnectionAttributesEntry 5 }

iscsiCxnLocalAddr OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The local Inet address used by this connection instance."
 ::= { iscsiConnectionAttributesEntry 6 }

iscsiCxnLocalPort OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The local port used by this connection instance."
 ::= { iscsiConnectionAttributesEntry 7 }

iscsiCxnRemoteAddrType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The type of Inet address in the next object."
 ::= { iscsiConnectionAttributesEntry 8 }

iscsiCxnRemoteAddr OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The remote Inet address used by this connection instance."
 ::= { iscsiConnectionAttributesEntry 9 }

iscsiCxnRemotePort OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The remote port used by this connection instance."
::= { iscsiConnectionAttributesEntry 10 }

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iscsiTargetInfo OBJECT IDENTIFIER ::= { iscsiInstanceObjects 4 }
iscsiTargetObjects OBJECT IDENTIFIER ::= { iscsiTargetInfo 1 }
iscsiTargetScalars OBJECT IDENTIFIER ::= { iscsiTargetInfo 2 }

-- Target Attributes Table

iscsiTargetAttributesTable OBJECT-TYPE
SYNTAX                         SEQUENCE OF IscsiTargetAttributesEntry
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
   "A list of targets belonging to each iSCSI instance
   present on the system."
::= { iscsiTargetInfo 3 }

iscsiTargetAttributesTable OBJECT-TYPE
SYNTAX                         IscsiTargetAttributesEntry
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
   "An entry (row) containing management information applicable
   to a particular target instance."
INDEX { iscsiInstIndex, iscsiTgtIndex }
::= { iscsiTargetAttributesTable 1 }

IscsiTargetAttributesEntry ::= SEQUENCE {
   iscsiTgtIndex                  Unsigned32,
   iscsiTgtName                   Utf8String,
   iscsiTgtAlias                  Utf8String,
   iscsiTgtLastFailureTime        TimeStamp,
   iscsiTgtLastFailureType        VariablePointer,
   iscsiTgtLastIntrFailureName    Utf8String,
   iscsiTgtLastIntrFailureAddrType InetAddressType,
   iscsiTgtLastIntrFailureAddr    InetAddress
}

iscsiTgtIndex OBJECT-TYPE
SYNTAX                         Unsigned32 (1..4294967295)
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
   "An arbitrary integer used to uniquely identify a particular
target instance within an iSCSI instance present on the node."
::= { iscsiTargetAttributesEntry 1 }

iscsiTgtName OBJECT-TYPE
SYNTAX         Utf8String
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "A globally unique, UTF-8 identifier for this Target. The
Target Name is independent of the location of the target,
and can be resolved into a set of addresses through various
discovery services."
::= { iscsiTargetAttributesEntry 2 }

iscsiTgtAlias OBJECT-TYPE
SYNTAX         Utf8String
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "A human-readable name or description of the target. If
configured, this alias may be communicated to the initiator
during a Login Response message. This string is not used as
an identifier, but can be displayed by the initiator’s user
interface in a list of targets to which it is connected."
::= { iscsiTargetAttributesEntry 3 }

iscsiTgtLastFailureTime OBJECT-TYPE
SYNTAX         TimeStamp
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "The value of object sysUpTime when the last failure
occurred."
::= { iscsiTargetAttributesEntry 4 }

iscsiTgtLastFailureType OBJECT-TYPE
SYNTAX         VariablePointer
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "The exact counter instance in the iscsiTargetLoginStatsTable
that was incremented when the last failure occurred."
::= { iscsiTargetAttributesEntry 5 }

iscsiTgtLastIntrFailureName OBJECT-TYPE
SYNTAX         Utf8String
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION
"An UTF-8 string giving the name of the initiator
that failed the last login attempt."
 ::= { iscsiTargetAttributesEntry 6 }

iscsiTgtLastIntrFailureAddrType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The type of Inet address in the next object."
 ::= { iscsiTargetAttributesEntry 7 }

iscsiTgtLastIntrFailureAddr OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An Inet address giving the host address of the initiator
that failed the last login attempt."
 ::= { iscsiTargetAttributesEntry 8 }

-- Target Login Stats Table

iscsiTargetLoginStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiTargetLoginStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table of counters which keep track of the number of
times this target failed an initiator’s login attempt
for each important reason."
 ::= { iscsiTargetInfo 4 }

iscsiTargetLoginStatsEntry OBJECT-TYPE
SYNTAX IscsiTargetLoginStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry (row) containing counters for each login
failure reason."
AUGMENTS { iscsiTargetAttributesEntry }
 ::= { iscsiTargetLoginStatsTable 1 }

IscsiTargetLoginStatsEntry ::= SEQUENCE {
  iscsiTgtLoginAccepts Counter32,
  iscsiTgtLoginOtherFails Counter32,
  iscsiTgtLoginRedirects Counter32,
iscsiTgtLoginAuthorizeFails Counter32,
iscsiTgtLoginAuthenticateFails Counter32,
iscsiTgtLoginNegotiateFails Counter32
}

iscsiTgtLoginAccepts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Login Response PDUs with status 0x0000, Accept Login, transmitted by this target."
::= { iscsiTargetLoginStatsEntry 1 }

iscsiTgtLoginOtherFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Login Response PDUs with any status code not counted in the other failure status objects below that was transmitted by this target."
::= { iscsiTargetLoginStatsEntry 3 }

iscsiTgtLoginRedirects OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Login Response PDUs with status class 0x01, Redirection, transmitted by this target."
::= { iscsiTargetLoginStatsEntry 2 }

iscsiTgtLoginAuthorizeFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Login Response PDUs with status 0x0202, Forbidden Target, transmitted by this target.

If this counter is incremented, an iscsiTgtLoginFailure notification should be sent."
::= { iscsiTargetLoginStatsEntry 4 }

iscsiTgtLoginAuthenticateFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"The count of Login Response PDUs with status 0x0201,
Authentication Failed, transmitted by this target
If this counter is incremented, an iscsiTgtLoginFailure
notification should be sent."
 ::= { iscsiTargetLoginStatsEntry 5 }

iscsiTgtLoginNegotiateFails OBJECT-TYPE
SYNTAX                         Counter32
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"The number of times a target has effectively refused a
login because the parameter negotiation failed.
[Ed. While this situation can occur, the exact mechanism
is as yet undefined in the iSCSI Protocol Spec.]
If this counter is incremented, an iscsiTgtLoginFailure
notification should be sent."
 ::= { iscsiTargetLoginStatsEntry 6 }

-- Target Logout Stats Table

iscsiTargetLogoutStatsTable OBJECT-TYPE
SYNTAX                         SEQUENCE OF IscsiTargetLogoutStatsEntry
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
"When a target receives a Logout command, it responds
with a Logout Response that carries a status code.
This table contains counters for both normal and
abnormal logout requests received by this target."
 ::= { iscsiTargetInfo 5 }

iscsiTargetLogoutStatsEntry OBJECT-TYPE
SYNTAX                         IscsiTargetLogoutStatsEntry
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
"An entry (row) containing counters of Logout Response
PDUs that were transmitted by a particular target instance."
AUGMENTS { iscsiTargetAttributesEntry }
 ::= { iscsiTargetLogoutStatsTable 1 }

IscsiTargetLogoutStatsEntry ::= SEQUENCE {
iscsiTgtLogoutNormals OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Logout Command PDUs with reason code 0, Closes the session, received by this target."
::= { iscsiTargetLogoutStatsEntry 1 }

iscsiTgtLogoutOthers OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Logout Command command PDUs with any status code other than 0, received by the target."
::= { iscsiTargetLogoutStatsEntry 2 }

iscsiAccessListInfo OBJECT IDENTIFIER ::= { iscsiTargetObjects 2 }
iscsiAccessListObjects OBJECT IDENTIFIER ::= { iscsiAccessListInfo 1 }
iscsiAccessList Scalars OBJECT IDENTIFIER ::= { iscsiAccessListInfo 2 }

-- Access List Attributes Table
iscsiAccessListAttributesTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiAccessListAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A list of iSCSI initiators which will be granted access to iSCSI resources through targets within the iSCSI instance."
::= { iscsiAccessListInfo 3 }

iscsiAccessListAttributesEntry OBJECT-TYPE
SYNTAX IscsiAccessListAttributesEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (row) containing management information applicable to an initiator which is known by a target
within an iSCSI instance on this node."
INDEX { iscsiInstIndex, iscsiTgtIndex, iscsiALIndex }
::= { iscsiAccessListAttributesTable 1 }

iscsiAccessListAttributesEntry ::= SEQUENCE {
  iscsiALIndex                   Unsigned32,
  iscsiALInitiatorName           Utf8String
}

iscsiALIndex OBJECT-TYPE
SYNTAX                         Unsigned32 (1..4294967295)
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
"An arbitrary integer used to uniquely identify a particular
Access List instance of a particular target instance within an
iSCSI instance present on the node."
::= { iscsiAccessListAttributesEntry 1 }

iscsiALInitiatorName OBJECT-TYPE
SYNTAX                         Utf8String
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"The globally unique name of the initiator, sent to the
target in the <InitiatorName> key of the Login Command."
::= { iscsiAccessListAttributesEntry 2 }

-----------------------------------------------

iscsiInitiatorInfo OBJECT IDENTIFIER ::= { iscsiInstanceObjects 5 }

iscsiInitiatorObjects OBJECT IDENTIFIER ::= { iscsiInitiatorInfo 1 }
iscsiInitiatorScalars OBJECT IDENTIFIER ::= { iscsiInitiatorInfo 2 }

-- Initiator Attributes Table

iscsiInitiatorAttributesTable OBJECT-TYPE
SYNTAX                         SEQUENCE OF IscsiInitiatorAttributesEntry
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
"A list of initiators belonging to each iSCSI instance
present on the system."
::= { iscsiInitiatorInfo 3 }

iscsiInitiatorAttributesEntry OBJECT-TYPE
SYNTAX                        IscsiInitiatorAttributesEntry
An entry (row) containing management information applicable to a particular initiator instance.

```
::= { iscsiInitiatorAttributesTable 1 }
```

```
IscsiInitiatorAttributesEntry ::= SEQUENCE {
    iscsiIntrIndex                 Unsigned32,
    iscsiIntrName                  Utf8String,
    iscsiIntrAlias                 Utf8String,
    iscsiIntrLastFailureTime       TimeStamp,
    iscsiIntrLastFailureType       VariablePointer,
    iscsiIntrLastTgtFailureName    Utf8String,
    iscsiIntrLastTgtFailureAddrType InetAddressType,
    iscsiIntrLastTgtFailureAddr    InetAddress
}
```

```
iscsiIntrIndex OBJECT-TYPE
SYNTAX                         Unsigned32 (1..4294967295)
MAX-ACCESS                     not-accessible
STATUS                         current
DESCRIPTION
"An arbitrary integer used to uniquely identify a particular Initiator instance within an iSCSI instance present on the node."
 ::= { iscsiInitiatorAttributesEntry 1 }
```

```
iscsiIntrName OBJECT-TYPE
SYNTAX                         Utf8String
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"A text-based identifier for this Initiator that is globally unique. The Initiator Name is independent of the location of the initiator."
 ::= { iscsiInitiatorAttributesEntry 2 }
```

```
iscsiIntrAlias OBJECT-TYPE
SYNTAX                         Utf8String
MAX-ACCESS                     read-only
STATUS                         current
DESCRIPTION
"A human-readable name or description of the initiator. If configured, this initiator alias may be communicated to the target during a Login Request message. This string is not used as an identifier, but can be displayed by the
target’s user interface in a list of initiators to which it is connected."
::= { iscsiInitiatorAttributesEntry 3 }

iscsiIntrLastFailureTime OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of object sysUpTime when the last failure occurred."
::= { iscsiInitiatorAttributesEntry 4 }

iscsiIntrLastFailureType OBJECT-TYPE
SYNTAX VariablePointer
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The exact counter instance in the iscsiInitiatorLoginStatsTable that was incremented when the last failure occurred."
::= { iscsiInitiatorAttributesEntry 5 }

iscsiIntrLastTgtFailureName OBJECT-TYPE
SYNTAX Utf8String
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An UTF-8 string giving the name of the target that failed the last login attempt."
::= { iscsiInitiatorAttributesEntry 6 }

iscsiIntrLastTgtFailureAddrType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The type of Inet address in the next object."
::= { iscsiInitiatorAttributesEntry 7 }

iscsiIntrLastTgtFailureAddr OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An Inet address giving the host address of the target that failed the last login attempt."
::= { iscsiInitiatorAttributesEntry 8 }
-- Initiator Login Stats Table

iscsiInitiatorLoginStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiInitiatorLoginStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table of counters which keep track of the number of times this initiator's login attempts failed for each important reason."
::= { iscsiInitiatorInfo 4 }

iscsiInitiatorLoginStatsEntry OBJECT-TYPE
SYNTAX IscsiInitiatorLoginStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry (row) containing counters of each major reason for an iSCSI login failure."
AUGMENTS { iscsiInitiatorAttributesEntry }
::= { iscsiInitiatorLoginStatsTable 1 }

IscsiInitiatorLoginStatsEntry ::= SEQUENCE {
  iscsiIntrLoginAcceptRspCounter32,
  iscsiIntrLoginOtherFailRspCounter32,
  iscsiIntrLoginRedirectRspCounter32,
  iscsiIntrLoginAuthenticateFailsCounter32,
  iscsiIntrLoginNegotiateFailsCounter32
}

iscsiIntrLoginAcceptRspCounter32 OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Login Response PDUs with status 0x0000, Accept Login, received by this initiator."
::= { iscsiInitiatorLoginStatsEntry 1 }

iscsiIntrLoginOtherFailRspCounter32 OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The count of Login Response PDUs received by this initiator with any status code not counted in the objects below."

::= { iscsiInitiatorLoginStatsEntry 2 }

iscsiIntrLoginRedirectRsp OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The count of Login Response PDUs with status class 0x01, Redirection, received by this initiator."
::= { iscsiInitiatorLoginStatsEntry 3 }

iscsiIntrLoginAuthFailRsp OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The count of Login Response PDUs with status class 0x201, Authentication Failed, received by this initiator."
::= { iscsiInitiatorLoginStatsEntry 4 }

iscsiIntrLoginAuthenticateFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of times the initiator has aborted a login because the target could not be authenticated. No response is sent.
If this counter is incremented, an iscsiIntrLoginFailure notification should be sent."
::= { iscsiInitiatorLoginStatsEntry 5 }

iscsiIntrLoginNegotiateFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of times the initiator has aborted a login because parameter negotiation with the target failed. No response is sent.
If this counter is incremented, an iscsiIntrLoginFailure notification should be sent."
::= { iscsiInitiatorLoginStatsEntry 6 }

-- Initiator Logout Stats Table

iscsiInitiatorLogoutStatsTable OBJECT-TYPE
SYNTAX SEQUENCE OF IscsiInitiatorLogoutStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"When an initiator attempts send a Logout command, the target responds with a Logout Response that carries a status code. This table contains a list of counters of Logout Response PDUs of each status code, that were received by each initiator instance belonging to this iSCSI instance present on this system."
::= { iscsiInitiatorInfo 5 }

iscsiInitiatorLogoutStatsEntry OBJECT-TYPE
SYNTAX IscsiInitiatorLogoutStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry (row) containing counters of Logout Response PDUs of each status code, that were received by a particular initiator instance."
AUGMENTS { iscsiInitiatorAttributesEntry }
::= { iscsiInitiatorLogoutStatsTable 1 }

IscsiInitiatorLogoutStatsEntry ::= SEQUENCE {
  isciIntrLogoutNormals         Counter32,
  isciIntrLogoutOthers          Counter32
}

isciIntrLogoutNormals OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The count of Logout Command PDUs with reason code 0, Closes the session, transmitted by this initiator."
::= { iscsiInitiatorLogoutStatsEntry 1 }

isciIntrLogoutOthers OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The count of Logout Command command PDUs with any status code other than 0, transmitted by this initiator."
::= { iscsiInitiatorLogoutStatsEntry 2 }

-- Notifications

-- First, define a dummy number to allow SMIv2 Notifications to be
-- converted to SMIv1 Traps
iscsiNotificationsPrefix OBJECT IDENTIFIER ::= { iscsiNotifications 0 }

iscsiTgtLoginFailure NOTIFICATION-TYPE
OBJECTS {
  iscsiTgtLastFailureType,
  iscsiTgtLastIntrFailureName,
  iscsiTgtLastIntrFailureAddrType,
  iscsiTgtLastIntrFailureAddr
}
STATUS current
DESCRIPTION
  "Sent when a login is failed by a target. It is expected that
  only authorization, authentication, and negotiation failures
  will be flagged."
::= { iscsiNotificationsPrefix 1 }

iscsiIntrLoginFailure NOTIFICATION-TYPE
OBJECTS {
  iscsiIntrLastFailureType,
  iscsiIntrLastTgtFailureName,
  iscsiIntrLastTgtFailureAddrType,
  iscsiIntrLastTgtFailureAddr
}
STATUS current
DESCRIPTION
  "Sent when a login is failed by a initiator. It is expected that
  only authentication, and negotiation failures will be flagged."
::= { iscsiNotificationsPrefix 2 }

iscsiInstSessionFailure NOTIFICATION-TYPE
OBJECTS {
  iscsiInstLastSsnFailureType,
  iscsiInstLastSsnRmtNodeName
}
STATUS current
DESCRIPTION
  "Sent when an active session is failed by either the initiator
  or the target."
::= { iscsiNotificationsPrefix 3 }
-- Conformance Statements

iscsiGroups OBJECT IDENTIFIER ::= { iscsiConformance 1 }

iscsiInstanceAttributesGroup OBJECT-GROUP
OBJECTS {
  iscsiInstanceNumber,
  iscsiInstName,
  iscsiInstVersionMin,
  iscsiInstVersionMax,
  iscsiInstVendorID,
  iscsiInstVendorVersion,
  iscsiInstTargetPortalNumber,
  iscsiInstInitiatorPortalNumber,
  iscsiInstSessionNumber,
  iscsiInstTargetNumber,
  iscsiInstInitiatorNumber,
  iscsiInstNameServiceAddrType,
  iscsiInstNameServiceAddr,
  iscsiInstNameServicePort,
  iscsiInstNameServiceType,
  iscsiInstLastSsnFailureType,
  iscsiInstLastSsnRmtNodeName
}
STATUS current
DESCRIPTION "."
::= { iscsiGroups 1 }

iscsiInstanceSessionErrorStatsGroup OBJECT-GROUP
OBJECTS {
  iscsiInstSsnDigestErrors,
  iscsiInstSsnCxnTimeoutErrors,
  iscsiInstSsnFormatErrors
}
STATUS current
DESCRIPTION "."
::= { iscsiGroups 2 }

iscsiTargetPortalAttributesGroup OBJECT-GROUP
OBJECTS {
  iscsiTgtPortalProtocol,
  iscsiTgtPortalAddrType,
  iscsiTgtPortalAddr,
  iscsiTgtPortalPort,
  iscsiTgtPortalTag
}
::= { iscsiGroups 3 }

iscsiInitiatorPortalAttributesGroup OBJECT-GROUP
  OBJECTS {
    iscsiIntrPortalProtocol,
    iscsiIntrPortalAddrType,
    iscsiIntrPortalAddr,
    iscsiIntrPortalTag
  }
  STATUS current
  DESCRIPTION "".
::= { iscsiGroups 4 }

iscsiSessionAttributesGroup OBJECT-GROUP
  OBJECTS {
    iscsiSsnDirection,
    iscsiSsnTargetName,
    iscsiSsnTsid,
    iscsiSsnInitiatorName,
    iscsiSsnIsid,
    iscsiSsnAlias,
    iscsiSsnUserR2t,
    iscsiSsnBidirectionalUseR2t,
    iscsiSsnImmediateData,
    iscsiSsnType,
    iscsiSsnMaxOutstandingR2t,
    iscsiSsnMaxDataPduLength,
    iscsiSsnFirstBurstSize,
    iscsiSsnConnectionNumber,
    iscsiSsnMaxConnections,
    iscsiSsnHeaderIntegrity,
    iscsiSsnDataIntegrity,
    iscsiSsnAuthMethod,
    iscsiSsnCommandReplay,
    iscsiSsnDataOrder,
    iscsiSsnDataDeliveryOrder
  }
  STATUS current
  DESCRIPTION "".
::= { iscsiGroups 5 }

iscsiSessionStatsGroup OBJECT-GROUP
  OBJECTS {
iscsiSsnCmdPdus,
iscsiSsnRspPdus,
iscsiSsnTxDataOctets,
iscsiSsnRxDataOctets
}
STATUS current
DESCRIPTION
"."
 ::= { iscsiGroups 6 }

iscsiSessionCxnErrorStatsGroup OBJECT-GROUP
  OBJECTS {
    iscsiSsnDigestErrors,
    iscsiSsnCxnTimeoutErrors
  }
  STATUS current
  DESCRIPTION
  "".
  ::= { iscsiGroups 7 }

iscsiConnectionAttributesGroup OBJECT-GROUP
  OBJECTS {
    iscsiCxnCid,
    iscsiCxnState,
    iscsiCxnProtocol,
    iscsiCxnLocalAddrType,
    iscsiCxnLocalAddr,
    iscsiCxnLocalPort,
    iscsiCxnRemoteAddrType,
    iscsiCxnRemoteAddr,
    iscsiCxnRemotePort
  }
  STATUS current
  DESCRIPTION
  "".
  ::= { iscsiGroups 8 }

iscsiTargetAttributesGroup OBJECT-GROUP
  OBJECTS {
    iscsiTgtName,
    iscsiTgtAlias,
    iscsiTgtLastFailureTime,
    iscsiTgtLastFailureType,
    iscsiTgtLastIntrFailureName,
    iscsiTgtLastIntrFailureAddrType,
    iscsiTgtLastIntrFailureAddr
  }
  STATUS current
DESCRIPTION
  
::= { iscsiGroups 9 }

iscsiTargetLoginStatsGroup OBJECT-GROUP
  OBJECTS {
    iscsiTgtLoginAccepts,
    iscsiTgtLoginOtherFails,
    iscsiTgtLoginRedirects,
    iscsiTgtLoginAuthorizeFails,
    iscsiTgtLoginAuthenticateFails,
    iscsiTgtLoginNegotiateFails
  }
  STATUS current
  DESCRIPTION
    
::= { iscsiGroups 10 }

iscsiTargetLogoutStatsGroup OBJECT-GROUP
  OBJECTS {
    iscsiTgtLogoutNormals,
    iscsiTgtLogoutOthers
  }
  STATUS current
  DESCRIPTION
    
::= { iscsiGroups 11 }

iscsiAccessListAttributesGroup OBJECT-GROUP
  OBJECTS {
    iscsiALInitiatorName
  }
  STATUS current
  DESCRIPTION
    
::= { iscsiGroups 12 }

iscsiInitiatorAttributesGroup OBJECT-GROUP
  OBJECTS {
    iscsiIntrName,
    iscsiIntrAlias,
    iscsiIntrLastFailureTime,
    iscsiIntrLastFailureType,
    iscsiIntrLastTgtFailureName,
    iscsiIntrLastTgtFailureAddrType,
    iscsiIntrLastTgtFailureAddr
  }
  STATUS current
DESCRIPTION
"."
 ::= { iscsiGroups 13 }

iscsiInitiatorLoginStatsGroup OBJECT-GROUP
OBJECTS {
  iscsiIntrLoginAcceptRsp,
  iscsiIntrLoginOtherFailRsp,
  iscsiIntrLoginRedirectRsp,
  iscsiIntrLoginAuthFailRsp,
  iscsiIntrLoginAuthenticateFails,
  iscsiIntrLoginNegotiateFails
}
STATUS current
DESCRIPTION
"."
 ::= { iscsiGroups 14 }

iscsiInitiatorLogoutStatsGroup OBJECT-GROUP
OBJECTS {
  iscsiIntrLogoutNormals,
  iscsiIntrLogoutOthers
}
STATUS current
DESCRIPTION
"."
 ::= { iscsiGroups 15 }

iscsiNotificationsGroup NOTIFICATION-GROUP
NOTIFICATIONS {
  iscsiTgtLoginFailure,
  iscsiIntrLoginFailure,
  iscsiInstSessionFailure
}
STATUS current
DESCRIPTION
"."
 ::= { iscsiGroups 16 }

------------------------------------------------------------------------

iscsiCompliances OBJECT IDENTIFIER ::= { iscsiConformance 2 }

iscsiComplianceV1 MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"Initial version of compliance statement based on initial version of MIB."
7. Security Considerations

This MIB currently contains no read-write, read-create, or RowStatus attributes, and cannot be directly used to affect the configuration or operation of an iSCSI entity.

Information gleaned from this MIB could be used to make connections to the iSCSI targets it represents. However, it is the responsibility of the initiators and targets involved to authenticate each other to ensure that an inappropriately advertised or discovered initiator or target does not compromise their security. These issues are discussed in [ISCSI].

8. References


9. Authors’ Addresses

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