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Definitions of Managed Objects for Server Cache Synchronization Protocol Using SMIv2

Status of this Memo

Abstract

This document defines the Management Information Base (MIB) for supporting Server Cache Synchronization Protocol (SCSP)[1], [2], [3], [4]. SCSP is used to solve the generalized cache synchronization/cache-replication problem for distributed protocol entities. In a client/server paradigm, SCSP synchronizes caches (or a portion of the caches) of a set of server entities of a particular protocol which are bound to a Server Group.

The MIB module specified in this document follows the Structure of

Management Information (SMI) for the Simple Network Management Protocol (SNMP) Version 2.

Revision History

April 1998, removed Hello finite state machine related entries from DCS table, notification group, and conformance definition. Hello finite state machine related entries will be placed in the protocol dependent MIB, where link layer information can be grouped. Move retransmit related entries from DCS to LS table.

1. Introduction

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for hosts or routers that use Server Cache Synchronization Protocol (SCSP) to synchronize caches among the distributed servers in a server group. MIB objects are defined to enable management of the Local server (LS) and the cache synchronization/replication between LS and its associated Directly Connected Servers (DCS).

2. The SNMPV2 Network Management Framework

IETF RFC 1157 [5], RFC 1213 [6], and RFC 1902 [7] form the three major components of the SNMPv2 Network Management Framework.

- o RFC 1902 specifies the SMI, which is the mechanisms used for describing and naming objects for the purpose of management.
- o RFC 1213 defines the second version of the Management Information Base (MIB-II), which is the core set of managed objects for the TCP/IP based Internets.
- o RFC 1157 and/or RFC 1905 [8] specifies the protocol operations for SNMPV2, with respect to the to the sending and receiving of SNMP managed information.

In addition, RFC 1903 [9] defines Textual conventions for SNMPv2 and RFC 1904 [10] specifies the conformance statements for SNMPv2.

The SNMPv2 Framework allows new objects to be defined for the purpose of experimentation and evaluation.

2.1 Object Definition

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to refer to the object type.

3. Overview

SCSP contains three sub protocols: the "Hello" protocol, the "Cache Alignment" Protocol, and the "Cache State Update" protocol. The Hello protocol is used to monitor the status of the connections between the Local Server and its Directly Connected Servers. The "Cache Alignment" protocol is used to synchronize the cache of an initializing LS with the cache of its DCSs. The "Cache State Update" protocol is used to update the state of cache entries once the servers are synchronized.

Synchronization is performed on a per Server Group / Protocol basis. That is, a separate instance of the protocol is run for each SG in the box. Therefore, the SGID/PID pair uniquely identifies an instance of SCSP. Furthermore, A separate instance of the "Hello" and "Cache Alignment" protocol are maintained for each DCS of the Server Group. State machines exist to execute the protocol independently for each DCS session. For more information, refer to [1].

SCSP is used to synchronize distributed servers running a client/server protocol. Currently SCSP support for Classic IP (RFC 2225)[11], MARS (RFC 2022)[12], and NHRP (RFC 2332)[13] has been defined in the protocol dependent part of SCSP [2], [3], [4].

The following terms are defined in the SCSP definition and used frequently. They are included here for reference:

Server Group (SG)
The SCSP synchronizes caches (or a portion of the caches) of a set of server entities which are bound to a SG through some means (e.g., all servers belonging to a Logical IP Subnet (LIS)[11]). Thus a SG is just a grouping of servers around some commonality.

SGID - Server Group ID
This ID is a 16 bit identification field that uniquely identifies the instance client/server protocol for which the servers of the SG are being synchronized. This implies that multiple instances of the same protocol may be in operation at the same time and have their servers synchronized independently of each other.

PID - Protocol ID
This field contains an identifier which identifies the client/server protocol which is making use of SCSP for the given message. The assignment of Protocol IDs for this field is given over to IANA.

Local Server (LS)
Local Server is the server sitting on this IP end station or router and is the server under scrutiny.

LSID - Local Server ID
The LSID is a unique token that identifies an LS. This value might be taken from the protocol address of the LS.

Directly Connected Server (DCS)
Directly Connected Server is the server which is directly connected to the LS, e.g., there exists a VC between the LS and DCS. Thus, every server is a DCS from the point of view of every other server which connects to it directly, and every server is an LS which has zero or more DCSs directly connected to it.

HFSM - Hello Finite State Machine
An LS has a HFSM associated with each of its DCSs. The HFSM monitors the state of the connectivity between the LS and a particular DCS.

CA Message - Cache Alignment Message
These messages allow an LS to synchronize its entire cache with that of the cache of one of its DCSs.

CAFSM - Cache Alignment Finite State Machine
The CAFSM monitors the state of the cache alignment between an LS and a particular DCS. There exists one CAFSM per DCS as seen from an LS.

CSA Record - Cache State Advertisement Record
A CSA is a record within a CSU message which identifies an update to the status of a "particular" cache entry.

CSAS Record - Cache State Advertisement Summary Record

A CSAS contains a summary of the information in a CSA. A server will send CSAS records describing its cache entries to another server during the cache alignment process. CSAS records are also included in a CSUS messages when an LS wants to request the entire CSA from the DCS. The LS is requesting the CSA from the DCS because the LS believes that the DCS has a more recent view of the state of the cache entry in question.

CSU Message - Cache State Update message
This is a message sent from an LS to its DCSs when the LS becomes aware of a change in state of a cache entry.

CSUS Message - Cache State Update Solicit Message
This message is sent by an LS to its DCS after the LS and DCS have exchanged CA messages. The CSUS message contains one or more CSAS records which represent solicitations for entire CSA records (as opposed to just the summary information held in the CSAS).

This document defines SCSP protocol independent MIB definition, which contains three tables: scspServerGroupTable, scspLSTable, and scspDCSTable.

The scspServerGroupTable contains information for the server group, such as the Server group ID, and Protocol ID. The scspLSTable contains the attributes associated with the Local Server, such as the Local server ID, HelloInterval, DeadFactor, and retransmit properties. Note that there is one to one mapping between one scspServerGroupEntry and one scspLSEntry, since only one Local Server is defined for each Server Group.

The scspDCSTable contains information associated with the DCS session between the Local Server and its associated Directly Connected Servers. The scspDCSTable keeps track the current state of the Cache Alignment State Machine. In addition, the scspDCSTable keeps track of statistics of messages exchanges such as the Cache Alignment messages. Note that one scspServerGroupEntry or one scspLSEntry may map to multiple scspDCSEntries, since in a server group multiple DCS may connect to the Local Server.

The Notifications Group contains the notification objects for supporting SCSP. SNMP trap scspCSAReXmExceed trap event is used to notify management that CSA exchange between LS and DCS has timed out.

4. Definition of the Server Cache Synchronization Protocol MIB

```
SCSP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
    experimental, Integer32, IpAddress, Counter32
       FROM SNMPv2-SMI
    TEXTUAL-CONVENTION, RowStatus
       FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP
       FROM SNMPv2-CONF
    ;



scspMIB MODULE-IDENTITY
   LAST-UPDATED "9808200000Z" -- October 10, 1998
   ORGANIZATION "IETF Internetworking Over NBMA Working Group (ion)"
   CONTACT-INFO
       "Jim Luciani (luciani@BayNetworks.com)
        Bay Networks

        Cliff X. Wang (cliff_wang@vnet.ibm.com)
        Colin Verrilli (verrilli@vnet.ibm.com)
        IBM Corp."

   DESCRIPTION
        "This module defines a portion of the management
         information base (MIB) for managing Server Cache
         Synchronization protocols entities."
   ::= { experimental 2001 }
       -- Need to get an "official" experimental number from IANA


-- ****************************************************************

--   Textual Conversion

-- ****************************************************************


ScspPIDType ::= TEXTUAL-CONVENTION
    STATUS         current
    DESCRIPTION
         "The protocol type associated with a SCSP instance."
    SYNTAX         INTEGER {
                       atmarp(1),
```

```
                        nhrp(2),
                        mars(3),
                        dhcp(4),
                        lnni(5)
                    }


     ScspHFSMStateType ::= TEXTUAL-CONVENTION
         STATUS         current
         DESCRIPTION
               "The various states of the Hello Finite State Machine."
         SYNTAX         INTEGER {
                            down(1),
                            waiting(2),
                            uniConn(3),
                            biConn(4)
                        }

    ScspCAFSMStateType ::= TEXTUAL-CONVENTION
      STATUS         current
      DESCRIPTION
             "The various states of the Cache Alignment Finite
              State Machine."
      SYNTAX         INTEGER {
                        down(1),
                        msNego(2),
                        cacheSumm(3),
                        cacheUpdate(4),
                        aligned(5)
                    }



     SCSPVPIInteger ::= TEXTUAL-CONVENTION
        STATUS     current
        DESCRIPTION
            "An integer large enough to contain the value of a VPI."
        SYNTAX     Integer32 (0..255)

     SCSPVCIInteger ::= TEXTUAL-CONVENTION
        STATUS     current
        DESCRIPTION
            "An integer large enough to contain the value of a VCI."
        SYNTAX     Integer32 (0..65535)



   -- ************************************************************
```

```
   --  Top Level structure of the SCSP MIB

   -- ****************************************************************


   scspObjects        OBJECT IDENTIFIER ::= { scspMIB 1}
   scspNotifications  OBJECT IDENTIFIER ::= { scspMIB 2} scspConformance
   OBJECT IDENTIFIER ::= { scspMIB 3}

   -- ****************************************************************

   --   SCSP MIB Objects

   -- ****************************************************************



   -- ****************************************************************

   --   SCSP Server Group Objects

   -- ****************************************************************



   scspServerGroupTable OBJECT-TYPE
       SYNTAX   SEQUENCE OF ScspServerGroupEntry
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
             "The objects defined in this table are used to for the
              management of server groups. There is one entry in this
              table for each server group."
       ::= { scspObjects 1}


   scspServerGroupEntry OBJECT-TYPE
       SYNTAX   ScspServerGroupEntry
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
             "Each entry contains attributes associated with a scsp
              server group."
       INDEX {scspServerGroupID, scspServerGroupPID }
       ::= { scspServerGroupTable 1}


   ScspServerGroupEntry ::= SEQUENCE {
```

```
      scspServerGroupID                 Integer32,
      scspServerGroupPID                ScspPIDType,
      scspServerGroupRowStatus          RowStatus}


   scspServerGroupID  OBJECT-TYPE
       SYNTAX   Integer32 (0..65535)
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
             "This is the Group ID of this SCSP server group instance."
       ::= { scspServerGroupEntry 1 }


   scspServerGroupPID  OBJECT-TYPE
       SYNTAX     ScspPIDType
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
             "This is the protocol ID of this SCSP server group
              instance."
       ::= { scspServerGroupEntry 2 }



   scspServerGroupRowStatus  OBJECT-TYPE
       SYNTAX   RowStatus
       MAX-ACCESS  read-create
       STATUS   current
       DESCRIPTION
             "This object allows entries to be created and deleted
              from the scspServerGroupTable. This table is closely
              coupled with the scspLSTable, scspDCSTable, and the
              corresponding protocol dependent tables. A new row
              creation in this table results in creation of
              corresponding entries in the scspLSTable and scspDCSTable.
              In addition, entries in appropriate protocol dependent
              table may also be added. When the scspServerRowStatus is
              deleted by setting this object to destroy(6), this results
              in removing corresponding entries in scspLSTable,
              scspDCSTable, and those in corresponding protocol
              dependent table."
       REFERENCE
             "RFC 1903, 'Textual Conventions for version 2 of the
              Simple Network Management Protocol (SNMPv2).'"
       ::= { scspServerGroupEntry 3 }
```

```
   -- ****************************************************************

   --     SCSP LS Objects

   -- ****************************************************************

   scspLSTable OBJECT-TYPE
       SYNTAX   SEQUENCE OF ScspLSEntry
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
             "The objects defined in this table are for the
              management of SCSP local server (LS)."
       ::= { scspObjects 2}


   scspLSEntry OBJECT-TYPE
       SYNTAX   ScspLSEntry
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
             "Information about the Local Server in a SCSP group. Each
              entry contains attributes associated a LS."
       INDEX {scspServerGroupID,
              scspServerGroupPID,
              scspLSID
             }
       ::= { scspLSTable 1}


   ScspLSEntry ::= SEQUENCE {
       scspLSID                        OCTET STRING(SIZE(0..63)),
       scspLSHelloInterval             Integer32,
       scspLSDeadFactor                Integer32,
       scspLSCAReXmInterval            Integer32,
       scspLSCSUSReXmtInterval         Integer32,
       scspLSCSUReXmtInterval          Integer32,
       scspLSCSAMaxReXmt               Integer32,
       scspLSRowStatus                 RowStatus
       }



   scspLSID  OBJECT-TYPE
       SYNTAX   OCTET STRING(SIZE(0..63))
       MAX-ACCESS  not-accessible
       STATUS   current
       DESCRIPTION
```

```
            "This is the Local Server ID of this Local Server."
        ::= { scspLSEntry 1 }


    scspLSHelloInterval  OBJECT-TYPE
        SYNTAX   Integer32 (0..65535)
        MAX-ACCESS  read-create
        STATUS   current
        DESCRIPTION
              "This object contains the value for HelloInterval for
               the Local Server. It is the time (in seconds) between
               sending of consecutive Hello messages from this server."
        REFERENCE
              "SCSP draft, Section 2.1"
       ::= { scspLSEntry 2 }


    scspLSDeadFactor  OBJECT-TYPE
        SYNTAX   Integer32 (0..65535)
        MAX-ACCESS  read-create
        STATUS   current
        DESCRIPTION
              "This object contains the value for DeadFactor. The
               DeadFactor along with HelloInterval are sent with
               outgoing 'Hello' messages. If the DCS does not
               received 'Hello' message from this LS within the
               time out interval 'HelloInterval*DeadFactor'
               (in seconds), then the DCS MUST consider the LS to
               be stalled."
        REFERENCE
              "SCSP draft, Section 2.1"
        ::= { scspLSEntry 3 }


    scspLSCAReXmInterval  OBJECT-TYPE
        SYNTAX   Integer32 (0..65535)
        MAX-ACCESS  read-create
        STATUS   current
        DESCRIPTION
              "The time out interval (in seconds) for re-sending CA
                message to the DCS if no response is received."
        ::= { scspLSEntry 4 }


    scspLSCSUSReXmtInterval  OBJECT-TYPE
        SYNTAX   Integer32 (0..65535)
        MAX-ACCESS  read-create
        STATUS   current
```

```
        DESCRIPTION
              "The time out interval (in seconds) for re-sending
               CSUS Request to the DCS if not all CSA Records
               corresponding to the CSAS records in the CSUS
               message have been received."
        ::= { scspLSEntry  5 }


    scspLSCSUReXmtInterval  OBJECT-TYPE
        SYNTAX   Integer32 (0..65535)
        MAX-ACCESS  read-create
        STATUS   current
        DESCRIPTION
              "The time out interval (in seconds) for re-sending CSU
               Request to the DCS if not all CSA Records corresponding
               to the CSU request have not been acknowledged."
        ::= { scspLSEntry  6 }


    scspLSCSAMaxReXmt  OBJECT-TYPE
        SYNTAX   Integer32 (0..65535)
        MAX-ACCESS  read-create
        STATUS   current
        DESCRIPTION
              "The maximum number of retransmission of a CSA record.
               If acknowledge fails to occur when the maximum number
               is reached, an 'abnormal event' has happened between
               the LS/DCS link."
        ::= { scspLSEntry 7 }


    scspLSRowStatus  OBJECT-TYPE
        SYNTAX   RowStatus
        MAX-ACCESS  read-create
        STATUS   current
        DESCRIPTION
              "This object allows entries to be created and deleted
               from the scspLSTable. This table is closely coupled
               with DCS table and its corresponding protocol dependent
               tables. A new row creation in this table results
               in creation of new rows in the DCS table for each of
               its configured DCSs (peer servers). In addition,
               entries are created in the appropriate protocol
               dependent tables.  When the scspServerRowStatus is
               deleted by setting this object to destroy(6), this
               results in removing the corresponding entries in
               the DCS table of the same Server Group. In addition,
               entries in the corresponding protocol dependent table
```

```
              will also be removed."
        REFERENCE
              "RFC 1903."
        ::= { scspLSEntry 8 }


    -- ****************************************************************

    --     SCSP DCS Objects

    -- ****************************************************************

    scspDCSTable OBJECT-TYPE
        SYNTAX   SEQUENCE OF ScspDCSEntry
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
              "The objects defined in this table are used for the
               management of the DCS session between the LS and DCS."
        ::= { scspObjects 3}


    scspDCSEntry OBJECT-TYPE
        SYNTAX   ScspDCSEntry
        MAX-ACCESS  not-accessible
        STATUS   current
        DESCRIPTION
              "Information about each DCS session between the LS and
               its DCSs. The table is indexed by scspServerGroupID,
               scspServerGroupPID, and scspDCSID."
        INDEX { scspServerGroupID,
                scspServerGroupPID,
                scspDCSID
               }
        ::= { scspDCSTable 1}

    ScspDCSEntry ::= SEQUENCE {
        scspDCSID                       OCTET STRING(SIZE(0..63)),
        scspDCSCAFSMState               ScspCAFSMStateType,
        scspDCSCASequence               Integer32,
        scspDCSCAIn                     Counter32,
        scspDCSCAOut                    Counter32,
        scspDCSCAInvalidIn              Counter32,
        scspDCSCADuplicateIn            Counter32,
        scspDCSMSState                  INTEGER,
        scspDCSCSUSIn                   Counter32,
        scspDCSCSUSOut                  Counter32,
```

```
      scspDCSCSUSInvalidIn        Counter32,
      scspDCSCSURequestIn             Counter32,
      scspDCSCSURequestOut            Counter32,
      scspDCSCSUReplyOut              Counter32,
      scspDCSCSUReplyIn               Counter32,
      scspDCSCSUInvalidRequestIn      Counter32,
      scspDCSCSUInvalidReplyIn        Counter32,
      scspDCSCSAIn                    Counter32,
      scspDCSCSAOut                   Counter32,
      scspDCSCSAReXmted               Counter32,
      scspDCSCSAReXmtQDepth           Integer32,
      scspDCSRowStatus                RowStatus }



  scspDCSID  OBJECT-TYPE
      SYNTAX   OCTET STRING(SIZE(0..63))
      MAX-ACCESS  not-accessible
      STATUS   current
      DESCRIPTION
            "This ID is used to identify a directly connected
             server(DCS)."
      ::= { scspDCSEntry 1 }

  scspDCSCAFSMState  OBJECT-TYPE
      SYNTAX   ScspCAFSMStateType
      MAX-ACCESS  read-only
      STATUS   current
      DESCRIPTION
            "The current state of the Cache Alignment Finite State
             Machine. The allowable states are:
                      down(1),
                      msNego(2),
                      cacheSumm(3),
                      cacheUpdate(4),
                      aligned(5)."
      REFERENCE
          "SCSP draft, Section 2.2"
      ::= { scspDCSEntry 2 }



  scspDCSCASequence  OBJECT-TYPE
      SYNTAX   Integer32 (-2147483648..2147483647)
      MAX-ACCESS  read-only
      STATUS   current
```

```
        DESCRIPTION
              "The current CA sequence number associated with
               this DCS."
        ::= { scspDCSEntry 3 }


    scspDCSCAIn  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CA messages received from this DCS."
        ::= { scspDCSEntry 4 }


    scspDCSCAOut  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CA messages sent to this DCS."
        ::= { scspDCSEntry 5 }

    scspDCSCAInvalidIn  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of invalid CA messages received from this
               DCS.
               During Master/Slave negotiation state, two types of
               messages are correct:
               1) CA from the DCS has the M, I, and O bits on, with
                  no CSAS records and sender's ID is larger than the
                  LSID.
               2) CA from the DCS has the M and I bits off and the
                  sender's ID is smaller than the LSID.
               All other types of CA messages are invalid and
               ignored. During Cache Summarize State, two kinds of
               message errors are possible:
               1) M bit in received CA is set incorrectly;
               2) CA sequence number is neither equal nor one
                  more than the current LS's CA sequence number when
                  LS is slave or CA sequence number is neither equal
                  nor one less than the current LS's CA sequence number
                  when LS is master. Other common errors include failed
                  check sum, failed authentication if applicable,
                  errors in the message fields."
```

```
        REFERENCE
               "SCSP draft, Section 2.2."
        ::= { scspDCSEntry 6 }


    scspDCSCADuplicateIn  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of duplicate CA messages received from
               this DCS. A CA message is considered duplicate when
               1)LS is master and received a CA message with its
                 sequence number one less than the current sequence
                 number; or
               2)LS is slave and received a CA message with its
                 sequence number equal to the LS's current sequence
                 number."
       REFERENCE
              "SCSP draft, Section 2.2"
       ::= { scspDCSEntry 7 }



    scspDCSMSState    OBJECT-TYPE
        SYNTAX   INTEGER {
                   master (1),
                   slave  (2)
        }
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The master/slave status of this DCS. This object
               should be ignored when CAFSM is in 'down' state."
        ::= { scspDCSEntry  8 }


    scspDCSCSUSIn   OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CSUS sent from this DCS to the LS."
        ::= { scspDCSEntry  9 }

    scspDCSCSUSOut   OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
```

```
        STATUS   current
        DESCRIPTION
              "The number of CSUS sent from LS to this DCS."
        ::= { scspDCSEntry  10 }


    scspDCSCSUSInvalidIn   OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of Invalid CSUS sent from this DCS to the LS."
        ::= { scspDCSEntry  11 }

    scspDCSCSURequestIn  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CSU requests LS received from this DCS."
        ::= { scspDCSEntry 12 }


    scspDCSCSUReplyOut  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CSU replies sent from LS to this DCS."
        ::= { scspDCSEntry 13 }


    scspDCSCSURequestOut  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CSU requests sent from LS to this DCS."
        ::= { scspDCSEntry 14 }


    scspDCSCSUReplyIn  OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS  read-only
        STATUS   current
        DESCRIPTION
              "The number of CSU replies LS received from this DCS."
        ::= { scspDCSEntry 15 }
```

```
   scspDCSCSUInvalidRequestIn  OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The number of invalid CSU requests LS received from
              this DCS. The possible errors in the CSU request
              messages: the received CSU request's Receiver ID is
              not equal to the LSID, etc.
              Other common errors include failed authentication if
              applicable, errors in the message fields, etc."
       ::= { scspDCSEntry 16 }



   scspDCSCSUInvalidReplyIn  OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The number of invalid CSU replies LS received from
              this DCS. The possible errors in the CSU reply
              messages: the received CSU reply's Receiver ID is not
              equal to the LSID, etc.
              Other common errors include failed authentication if
              applicable, errors in the message fields, etc."
       ::= { scspDCSEntry 17 }



   scspDCSCSAIn  OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The total number of CSA records received from
              this DCS to this LS."
       ::= { scspDCSEntry 18 }


   scspDCSCSAOut  OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The total number of CSA records sent from LS
              to this DCS."
       ::= { scspDCSEntry 19 }
```

```
   scspDCSCSAReXmted  OBJECT-TYPE
       SYNTAX   Counter32
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The total number of CSA records re-transmited from LS
              to this DCS."
       ::= { scspDCSEntry 20 }

   scspDCSCSAReXmtQDepth  OBJECT-TYPE
       SYNTAX   Integer32 (0..65535)
       MAX-ACCESS  read-only
       STATUS   current
       DESCRIPTION
             "The depth of CSA Re-transmit queue associated with
              this DCS. The CSAs in the Re-transmit queue are
              pending to acknowledged."
       ::= { scspDCSEntry 21 }


   scspDCSRowStatus  OBJECT-TYPE
       SYNTAX   RowStatus
       MAX-ACCESS  read-create
       STATUS   current
       DESCRIPTION
             "This object allows DCS entries to be created and
              deleted from the scspDCSTable.  This table is closely
              coupled with its corresponding protocol dependent table.
              A new row creation in this table results in creation of
              a new row in the corresponding protocol dependent table.
              When the scspServerRowStatus is deleted by setting this
              object to destroy(6), this results in removing the
              corresponding entries in its corresponding protocol
              dependent table."
       REFERENCE
             "RFC 1903, 'Textual Conventions for version 2 of the
              Simple Network Management Protocol (SNMPv2).'"
       ::= { scspDCSEntry 22 }


   -- ****************************************************************

   --       Notifications

   -- ****************************************************************
```

```
   scspCSAReXmExceed NOTIFICATION-TYPE
       OBJECTS {
               scspServerGroupID,
               scspServerGroupPID,
               scspDCSID
       }
       STATUS  current
       DESCRIPTION
             "Retransmission of a CSA to this DCS has exceeded
              maximum retry limit, indicating an 'abnormal event'
              has happened between the LS/DCS association. The
              HSFM associated with this DCS is transitioned into
              the 'Waiting' state, and a 'scspHFSMWaiting' trap
              is also generated."
       ::= { scspNotifications 1 }


   -- ****************************************************************

   -- Conformance Definitions

   -- ****************************************************************

   scspCompliances OBJECT IDENTIFIER ::= { scspConformance 1 }
   scspGroups      OBJECT IDENTIFIER ::= { scspConformance 2 }

   -- ****************************************************************

   --  SCSP MIB Compliance Statements

   -- ****************************************************************

   scspCompliance MODULE-COMPLIANCE
       STATUS  current
       DESCRIPTION
             "The compliance statement for entities that are required
              for the management of SCSP."
       MODULE
          MANDATORY-GROUPS {
               scspLSGroup,
               scspDCSGroup
          }

      ::= { scspCompliances 1 }


   scspLSGroup OBJECT-GROUP
       OBJECTS {
```

```
              scspServerGroupID,
              scspServerGroupPID,
              scspLSID,
              scspLSHelloInterval,
              scspLSCAReXmInterval,
              scspLSCSUSReXmtInterval,
              scspLSCSUReXmtInterval,
              scspLSCSAMaxReXmt,
              scspLSDeadFactor
       }
      STATUS   current
      DESCRIPTION
            "A collection of objects which support the management of
             the Server group and the Local Server. This group is
             mandatory."
      ::= { scspGroups 1 }


   scspDCSGroup OBJECT-GROUP
      OBJECTS {
              scspDCSID,
              scspDCSCAFSMState,
              scspDCSCAIn,
              scspDCSCAOut,
              scspDCSCAInvalidIn,
              scspDCSCADuplicateIn,
              scspDCSMSState,
              scspDCSCSUSIn,
              scspDCSCSUSOut,
              scspDCSCSURequestIn,
              scspDCSCSURequestOut,
              scspDCSCSUReplyOut,
              scspDCSCSUReplyIn,
              scspDCSCSUInvalidRequestIn,
              scspDCSCSUInvalidReplyIn,
              scspDCSCSAIn,
              scspDCSCSAOut,
              scspDCSCSAReXmted,
              scspDCSCSAReXmtQDepth
       }
      STATUS   current
      DESCRIPTION
            "A collection of objects which support the management of
             the information exchange session between the LS and its
             associated DCS. This group is mandatory."
      ::= { scspGroups 2 }
```

END

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