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**Simple Control Transmission Protocol
Management Information Base using SMIV2
<[draft-ietf-sigtran-sctp-mib-00.txt](#)>**

Status of This Memo

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Abstract

The Simple Control Transmission Protocol (SCTP) is a reliable datagram transfer protocol that has been designed to transport PSTN signalling messages over IP networks, but is capable of broader applications.

This memo defines the Management Information Base (MIB) module which describes managed objects for implementations of the SCTP.

Open Issues

- Remove this section.
- Add a "Revision History" section when needed.
- Decide under which object identifier branch of the SNMP tree, SCTP will be placed.
- Fill up the References Section.
- Review the Security Section (read-create values are not still in the MIB).

- Review the MAX-ACCESS clauses (index should not be read-write).
- MIB Organization: The unit of conformance (the last part of the MIB) could be structured according to protocol variables, association variables and statistics. Currently, there is no such a structure (based on the definition of the TCP MIB) but it should be nice to have it for a clearer organization. Feedback?
- Unordered data can be included in "Other Statistics".
- Consider to use the Counter64 for statistics. It is not backwards compatible with SNMPv1.

Table of Contents

1. Introduction	
1.1 Abbreviations	
2. The SNMP framework	
3. Structure of the MIB	
3.1 Protocol General Variables	
3.2 Association Tables	
3.3 State Related Parameters and Statistics	
3.4 Other Statistics	
4. Definitions	
4.1 Conformance Information	
4.1.1 Compliance Statements	
4.1.2 Units of Conformance	
5. References	
6. Security Considerations	
7. Authors' Addresses	

[1. Introduction](#)

This memo defines the Management Information Base (MIB) module which describes managed objects for implementations of the SCTP.

The document starts with a brief description of the SNMP framework and continues with the MIB explanation and security consideration among others.

The managed objects in this MIB module have been based on [RFC 2012](#): "SNMPv2 Management Information Base for the Transmission Control Protocol using SMIV2" [2].

Terms related to the SCTP architecture are explained in [1]. Other specific abbreviations are listed below.

1.1 Abbreviations

MIB - Management Information Base
SCTP - Simple Control Transmission Protocol
SMI - Structure of Management Information
SNMP - Simple Network Management Protocol

2. The SNMP Framework

>From its first publication, the Simple Network Management Protocol (SNMP) has become the most widely-used network-management tool for TCP/IP-based networks. SNMP defines a protocol for the exchange of management information, but does much more than that. It also defines a format for representing management information and a framework for organizing distributing systems into managing systems and managed agents. In addition, a number of specific data base structures, called management information bases (MIBs), have been defined as part of the SNMP suite; these MIBs specify managed objects for the most common network management subjects, including bridges, routers and LANs.

RFCs 2571 through 2575 describe an overall architecture plus specific message structures and security features, but do not define a new SNMP PDU format. Thus, the existing SNMPv1 or SNMPv2 PDU format is used within the new SNMPv3 architecture. [RFC 2570](#) gives a detailed introduction to the current management framework.

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.

3. Structure of the MIB

The MIB is divided into four main sections.

- General variables, where the main initial variables are listed.
- Association tables, to hold data from each association together with the main statistics (per association or transport address). Local and remote tables are included into the general association table to allow multiples IP addresses in order to have the

multihome feature.

- State related parameters to see how many state changes have been into the same SCTP layer
- Other Statistics for traffic measurements

3.1 Protocol General Variables

The first section of the MIB is filled with the general variables for the SCTP protocol. Parameters as the RTO related variables, streams, timers and heartbeat are described.

SCTP RTO mechanism is the same as defined in TCP. So, the following explanation can be contrasted in [RFC 2012](#). In SCTP protocol, only options 'other' and 'vanj' remain because SCTP protocol defines Van Jacobson's algorithm as the one to be used to calculate RTO. 'Other' is left for future use ('rsre' algorithm was eliminated because MIL-STD-1778 is Cancelled-No Superseding Document according to the Military Standard library and 'constant' option doesn't fulfill the SCTP protocol description).

Cookies and heartbeat values have been added according to the SCTP protocol.

Timers for initialization and shutdown procedures have been included, so that the operator can check them and take the proper actions when required.

Since SCTP is based on the transmission through streams, it's interesting to know the maximum number of streams allowed in a given association. The number of streams used will be negotiated at initialization time.

3.2 Association Tables

The part of the MIB to define each association is structured according to an expanded table. There is a main table, indexed by the association identification. This main table contains information common for a given association (association id, SCTP user ports, primary address, negotiated number of inbound/outbound streams and statistics). But also, it contains two other tables :

- a) Table for local information:
This table stores information related to the local endpoint. It's indexed by the IP address.
- b) Table for remote information:
This table stores information related to a remote

endpoint. It's indexed by the IP addresses . It also contains under each index information only valid per IP address, such as statistics, heartbeat issues, or the state of the reachability of the referenced IP address.

sctpAssocTable

```

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                                                                                   /      ...      |
| sctpAssocId (index)                                                             \      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocLocalSCTPPort                                                           \      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocRemSCTPPort                                                             /      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocRemAddressPrimary                                                       \      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocState                                                                   /      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocInStreams                                                               \      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocOutStreams                                                             /      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocRtxChunks                                                             \      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocGoesDown                                                               /      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocDropDatag                                                             \      ...      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocLocalAddressTable                                                       \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocLocalIPAddress (index) \ ...| \      ...      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| sctpAssocRemAddressTable                                                         \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemIPAddress (index) \ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemAddressStatus \ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemAddressRTO \ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemAddressHeartBeatFlag \ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemAddressHeartBeatMisses\ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemAddressRtxChunks \ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /      |
|      | sctpAssocRemAddressT1expired \ ...| \      |
|      +-----+-----+-----+-----+-----+-----+-----+-----+-----+ /

```



```

        "MIB module developed for the SIGTRAN IETF group. Based on SCTPv6"
 ::= { mib-2 49 } -- This has to be determined

-- the SCTP group

sctp      OBJECT IDENTIFIER ::= { mib-2 6 } -- This has to be determined


-- PROTOCOL GENERAL VARIABLES
-- *****

sctpRtoAlgorithm OBJECT-TYPE
    SYNTAX      INTEGER {
                        other(1)      -- Other new one. Future use
                        vanj(2),      -- Van Jacobson's algorithm
                        }
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The algorithm used to determine the timeout value used for
        retransmitting unacknowledged chunks"
    ::= { sctp 1 }

sctpRtoMin OBJECT-TYPE
    SYNTAX      Integer32
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The minimum value permitted by a SCTP implementation for the
        retransmission timeout, measured in milliseconds. More
        refined semantics for objects of this type depend upon the
        algorithm used to determine the retransmission timeout.
        Recommended value is 1000 milliseconds".

    ::= { sctp 2 }

sctpRtoMax OBJECT-TYPE
    SYNTAX      Integer32
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The maximum value permitted by a SCTP implementation for the
        retransmission timeout, measured in milliseconds. More
        refined semantics for objects of this type depend upon the
        algorithm used to determine the retransmission timeout.
        Recommended value is 60000 milliseconds".
    ::= { sctp 3 }

```

sctpRtoInitial OBJECT-TYPE

SYNTAX Integer32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Initial value for the Retransmission timer. Recommended
value is 3000 milliseconds"

::= { sctp 4 }

sctpValCookieLife OBJECT-TYPE

SYNTAX Integer32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Valid cookie life in the 4-way start-up handshake procedure.
Recommended value: 5000 milliseconds"

::= { sctp 5 }

sctpMaxHeartBeatMisses OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of heartbeat misses to consider a path
is unreachable."

::= { sctp 6 }

sctpMaxRetr OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of retransmissions for data sending.
Recommended value: 10 attempts."

::= { sctp 7 }

sctpMaxInitRetr OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of retransmissions at the start-up phase.
Recommended value: 8 attempts"

::= { sctp 8 }

sctpInitialT1 OBJECT-TYPE

SYNTAX Integer32

UNITS "milliseconds"


```
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "Initial value for the Start-up-T1 timer."
::= { sctp 9 }
```

```
sctpInitialT2 OBJECT-TYPE
    SYNTAX      Integer32
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "Initial value for the Shutdown-T2 timer."
    ::= { sctp 10 }
```

```
sctpMaxInStreams OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The maximum number of inbound streams that an SCTP
        implementation allows. This value will be used to
        negotiate at start-up phase the outbound streams number."
    ::= { sctp 11 }
```

```
sctpMaxAssoc OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The maximum total number of associations that an SCTP
        implementation allows including all hosts."
    ::= { sctp 12 }
```

```
-- SCTP ASSOCIATION DESCRIPTION PARAMETERS
-- *****
```

```
-- the SCTP Association TABLE
-- *****
```

```
-- The SCTP association table contains information about all
-- entity's existing SCTP associations.
```

```
sctpAssocTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SctpAssocEntry
    MAX-ACCESS   not-accessible
```

```

STATUS      current
DESCRIPTION
    "A table containing SCTP association-specific information."
::= { sctp 13 }

```

```

sctpAssocEntry OBJECT-TYPE
    SYNTAX      SctpAssocEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "General common variables and statistics to the whole
        association"
    INDEX      { sctpAssocId }
    ::= { sctpAssocTable 1 }

```

```

SctpAssocEntry ::= SEQUENCE {
    sctpAssocId                Unsigned32,
    sctpAssocLocalSCTPPort     Integer32,
    sctpAssocRemSCTPPort       Integer32,
    sctpAssocRemAddressPrimary IPAddress,
    sctpAssocState              INTEGER,
    sctpAssocInStreams          Integer32,
    sctpAssocOutStreams         Integer32,
    sctpAssocRtxChunks          Counter32,      -- Statistic
    sctpAssocDropDatag          Counter32      -- Statistic
}

```

```

sctpAssocId OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "Association Identification"
    ::= { sctpAssocEntry 1 }

```

```

sctpAssocLocalSCTPPort OBJECT-TYPE
    SYNTAX      Integer32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "User Id for SCT Layer.."
    ::= { sctpAssocEntry 2 }

```

```

sctpAssocRemSCTPPort OBJECT-TYPE
    SYNTAX      Integer32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The peer's SCTP port number used for the communication. Each
        value is defined for the different Adaptation Layers by the
        IANA organization. It is fixed but can be different in the

```

```
server and client peer."
 ::= { sctpAssocEntry 3 }
```

sctpAssocRemAddressPrimary OBJECT-TYPE

```
SYNTAX      IPAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Primary destination IP address."
 ::= { sctpAssocEntry 4 }
```

sctpAssocState OBJECT-TYPE

```
SYNTAX      INTEGER {
                closed(1),
                cookieWait(2),
                cookieSent(3),
                established(4),
                shutdownPending(5),
                shutdownSent(6),
                shutdownReceived(7),
                deleteTCB(8)
            }
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "The state of this SCTP association.
```

As in TCP, the only value which may be set by a management station is deleteTCB. Accordingly, it is appropriate for an agent to return a 'badValue' response if a management station attempts to set this object to any other value.

If a management station sets this object to the value deleteTCB(8), then this has the effect of deleting the TCB (as defined in SCTP) of the corresponding association on the managed node, resulting in immediate termination of the association.

As an implementation-specific option, an ABORT chunk may be sent from the managed node to the other SCTP endpoint."

```
 ::= { sctpAssocEntry 5 }
```

sctpAssocInStreams OBJECT-TYPE

```
SYNTAX      Integer32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Inbound Streams according to the negotiation at the beginning
    of the association"
 ::= { sctpAssocEntry 6 }
```

```

sctpAssocOutStreams OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Outbound Streams according to the negotiation at association
        start up."
    ::= { sctpAssocEntry 7 }

-- Association Statistics

sctpAssocRtxChunks OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Number of retransmission chunks sent to the peer including
        all paths if multihoming endpoint."
    ::= { sctpAssocEntry 8 }

sctpAssocDropDatag OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Number of SCTP datagrams dropped by the host due to any reason
        (incorrect Adler-32, datagram impossible to decode, ...)."
    ::= { sctpAssocEntry 9 }

-- Expanded tables: Including Multihome feature

-- Local Address TABLE
-- *****

sctpAssocLocalAddressTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SctpAssocLocalAddressEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Expanded table of sctpAssocTable based on the AssocId index.
        It shows different interesting data for each local
        address which takes part in this association."
    ::= { sctp 14 }

sctpAssocLocalAddressEntry OBJECT-TYPE
    SYNTAX      SctpAssocLocalAddressEntry
    MAX-ACCESS  not-accessible

```

```

STATUS      current
DESCRIPTION
    "Local information about the available addresses."
INDEX      { sctpAssocId,      -- shared index
              sctpAssocLocalAddressIP}
 ::= { sctpAssocLocalAddressTable 1 }

SctpAssocLocalAddressEntry ::= SEQUENCE {
    sctpAssocLocalAddressIP      IPAddress
}

sctpAssocLocalAddressIP OBJECT-TYPE
    SYNTAX      IPAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A local IP address available for this association."
    ::= { sctpAssocLocalAddressEntry 1 }


-- Remote Addresses TABLE
-- *****

sctpAssocRemAddressTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SctpAssocRemAddressEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Expanded table of sctpAssocTable based on the AssocId index
         It shows different interesting data for each remote peer
         address which takes part in this association."
    ::= { sctp 15 }

sctpAssocRemAddressEntry OBJECT-TYPE
    SYNTAX      SctpAssocRemAddressEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Information about the remote address most important variables"
    INDEX      { sctpAssocId,      -- shared index
                sctpAssocRemAddressIP}
    ::= { sctpAssocRemAddressTable 1 }

SctpAssocRemAddressEntry ::= SEQUENCE {
    sctpAssocRemAddressIP      IPAddress,
    sctpAssocRemAddressStatus  INTEGER,
    sctpAssocRemAddressRTO     Integer32,
    sctpAssocRemAddressHeartBeatFlag  INTEGER,
    sctpAssocRemAddressHeartBeatMisses  Counter32,      -- Statistic

```

sctpAssocRemAddressRtxChunks	Counter32,	-- Statistic
sctpAssocRemAddressT1expired	Counter32,	-- Statistic
sctpAssocRemAddressT2expired	Counter32,	-- Statistic
sctpAssocRemAddressT3expired	Counter32	-- Statistic

}

sctpAssocRemAddressIP OBJECT-TYPE

SYNTAX IpAddress
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "A remote IP address available for this association."
 ::= { sctpAssocRemAddressEntry 1 }

sctpAssocRemAddressStatus OBJECT-TYPE

SYNTAX INTEGER {
 active(0),
 inactive(1)
 }
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The current status of the remote transport address."
 ::= { sctpAssocRemAddressEntry 2 }

sctpAssocRemAddressRTO OBJECT-TYPE -- T3-Rtx Timer

SYNTAX Integer32
 UNITS "milliseconds"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The current Retransmission Time-Out. Timer T3 as defined
 in the protocol SCTP."
 ::= { sctpAssocRemAddressEntry 3 }

sctpAssocRemAddressHeartBeatFlag OBJECT-TYPE

SYNTAX INTEGER {
 active(0),
 inactive(1)
 }
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The optional Heartbeat associated to one destination
 transport address could be activated or not (value = 1 or
 0, respectively)

 An IP address is inactive when it is impossible to send
 data to it. It is an anomalous situation caused by an
 error"
 ::= { sctpAssocRemAddressEntry 4 }

-- Remote Address Statistics

sctpAssocRemAddressHeartBeatMisses OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of Heartbeat chunks missed (not acknowledged
before timeout)."

::= { sctpAssocRemAddressEntry 5 }

sctpAssocRemAddressRtxChunks OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of retransmission chunks sent to this IP"

::= { sctpAssocRemAddressEntry 6 }

sctpAssocRemAddressT1expired OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of times that T1 timer expired (timer for sending
INIT message and receiving an anknowledge)."

::= { sctpAssocRemAddressEntry 7 }

sctpAssocRemAddressT2expired OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of times that T2 timer expired (shutdown timer)."

::= { sctpAssocRemAddressEntry 8 }

sctpAssocRemAddressT3expired OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of times that T3 timer expired (timer for sending
any message different from INIT and waiting for receiving
an anknowledge)."

::= { sctpAssocRemAddressEntry 9 }

-- STATE-RELATED VARIABLES AND STATISTICS

-- *****

sctpCurrEstab OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of SCTP associations for which the current state is either ESTABLISHED or SHUTDOWN-RECEIVED."

::= { sctp 16 }

sctpActiveEstab OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times SCTP associations have made a direct transition to the ESTABLISH state from the COOKIE-SENT state: COOKIE-SENT -> ESTABLISHED. This upper layer has been the starter of the communication."

::= { sctp 17 }

sctpPassiveEstab OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times SCTP associations have made a direct transition to the ESTABLISHED state from the CLOSE state: CLOSE -> ESTABLISHED. This means that the peer has been started the dialogue"

::= { sctp 18 }

sctpAborted OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times SCTP associations have made a direct transition to the CLOSE state from any state using the primitive 'ABORT': AnyState --Abort--> CLOSE."

::= { sctp 19 }

sctpShutdowns OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times SCTP associations have made a direct transition to the CLOSE state from either the SHUTDOWN-SENT state or the SHUTDOWN-RECEIVED state."


```
::= { sctp 20 }
```

```
-- OTHER LAYER STATISTICS  
-- *****
```

```
sctpAssocOutOfBlue OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Number of out of the blue datagrams (datagram correctly  
    formed but the receiver is not able to identify the  
    association to which this datagram belongs) handled  
    by the host."
```

```
::= { sctp 21 }
```

```
sctpStatSentChunks OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Number of SCTP chunks sent to the peers."
```

```
::= { sctp 22 }
```

```
sctpStatRecChunks OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Number of SCTP chunks received from the peer."
```

```
::= { sctp 23 }
```

```
sctpStatRetransChunks OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Number of SCTP chunks retransmitted to the peer."
```

```
::= { sctp 24 }
```

```
sctpStatUnorderSentChunks OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Number of unordered chunks sent to the peer."
```

```
::= { sctp 25 }
```

```
sctpStatUnorderRecChunks OBJECT-TYPE
```

```
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Number of unordered chunks received from the peer."
 ::= { sctp 26 }
```

-- 4.1 Conformance Information

```
sctpMIBConformance OBJECT IDENTIFIER ::= { sctpMIB 2 }
```

```
sctpMIBCompliances OBJECT IDENTIFIER ::= { sctpMIBConformance 1 }
```

```
sctpMIBGroups      OBJECT IDENTIFIER ::= { sctpMIBConformance 2 }
```

-- 4.1.1 Compliance Statements

```
sctpMIBCompliance MODULE-COMPLIANCE
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The compliance statement for SNMPv3 entities which
        implement TCP."
```

```
    MODULE -- this module
```

```
        MANDATORY-GROUPS { sctpGroup
                            }
 ::= { sctpMIBCompliances 1 }
```

-- 4.1.2 Units of conformance

```
sctpGroup OBJECT-GROUP
```

```
    OBJECTS { sctpRtoAlgorithm, sctpRtoMin, sctpRtoMax, sctpRtoInitial,
              sctpValCookieLife, sctpMaxHeartBeatMisses, sctpMaxRetr,
              sctpMaxInitRetr, sctpInitialT1, sctpInitialT2, sctpMaxInStreams,
              sctpMaxAssoc, sctpAssocId, sctpAssocLocalSCTPPort,
              sctpAssocRemSCTPPort, sctpAssocRemAddressPrimary, sctpAssocState,
              sctpAssocInStreams, sctpAssocOutStreams, sctpAssocRtxChunks,
              sctpAssocDropDatag, sctpAssocLocalAddressIP, sctpAssocRemAddressIP,
              sctpAssocRemAddressStatus, sctpAssocRemAddressRTO,
              sctpAssocRemAddressHeartBeatFlag, sctpAssocRemAddressHeartBeatMisses,
              sctpAssocRemAddressRtxChunks, sctpAssocRemAddressT1expired,
              sctpAssocRemAddressT2expired, sctpAssocRemAddressT3expired,
              sctpCurrEstab, sctpActiveEstab, sctpPassiveEstab, sctpAborted,
              sctpShutdowns, sctpStatSentChunks, sctpStatRecChunks,
              sctpStatRetransChunks, sctpStatUnorderSentChunks,
              sctpStatUnorderRecChunks}
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The sctp group of objects providing for management of SCTP
        entities."
```

```
 ::= { sctpMIBGroups 1 }
```

END

5. References

- [1] R. Stewart, Q. Xie, K. Morneault, C. Sharp, H. J. Schwarzbauer, T. Taylor, I. Rytina, M. Kalla, L. Zhang, V. Paxson, "Simple Control Transmission Protocol", Internet Draft <[draft-ietf-sigtran-sctp-06.txt](#)>, February 2000.
- [2] K. McCloghrie, "SNMPv2 Management Information Base for the Transmission Control Protocol using SMIV2", [RFC 2012](#), November 1996.
- [3] Stallings, W., "SNMP3: A Security Enhancement for SNMP", IEEE Communication Surveys, Forth quarter 1998, Vol. 1 No. 1.
- [4] Jacobson, V., "Congestion Avoidance and Control", SIGCOMM 1988, Stanford, California.
- [5] Cucchiara et al. "Definitions of Managed Objects for the Multiprotocol Label Switching, Label Distribution Protocol (LDP)", Internet Draft <[draft-ietf-mpls-ldp-mib-04.txt](#)>, January 2000.

6. Security Consideration

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

It is thus important to control even GET access to these objects and possibly to even encrypt the values of these object when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

SNMPv1 by itself is not a secure environment. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model [RFC 2574](#) [[RFC2574](#)] and the View-based Access Control Model [RFC 2575](#) [[RFC2575](#)] is recommended.

It is then a customer/user responsibility to ensure that the SNMP entity

giving access to an instance of this MIB, is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

7. Authors' Addresses

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8. Revision History

8.1 SCTP-MIB-predraft-01.txt

- o Open issues updated
- o [Section 2](#): Reference to RFC227x changed to RFC257x
- o [Section 4](#): Inside the sctpRtoAlgorithm definition has been put "other" first rather than last. That way, it won't end up in the middle of things when new enumerations are added later.