Definitions of Managed Objects for SMDS Interfaces using SMIV2

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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 objects for SMDS access interfaces. This includes the following access protocols:

SIP [13]
SIP/DXI [18] and [20]
SIP/FR [19]
SIP/ATM [24]

This memo replaces RFC 1304 [12], and defines a MIB module which is both compliant to the SNMPv2 SMI and semantically-identical to the existing RFC 1304-based definitions.

This memo also assumes application of the MIB II Interfaces group as defined in [9].

Table of Contents

1. The SNMPv2 Network Management Framework .............. 2
2. Objects ............................................. 3
   2.1 Format of Definitions ................................ 3
3. Overview .............................................. 4
   3.1 SIP Level 3 ........................................ 5
4. Object Definitions ...................................... 9
   4.1 The SIP Level 3 Group .............................. 10
   4.2 The SIP Level 2 Group .............................. 14
   4.3 The SIP PLCP Group ............................... 17
1. The SNMPv2 Network Management Framework

The SNMPv2 Network Management Framework consists of four major components. They are:

- **RFC 1442** [1] which defines the SMI, the mechanisms used for describing and naming objects for the purpose of management.


- **RFC 1445** [4] which defines the administrative and other architectural aspects of the framework.

- **RFC 1448** [5] which defines the protocol used for network access to managed objects.

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

This specification makes also use of:

- **RFC 1443** [2] which defines textual conventions for the specification of managed objects.

- **RFC 1444** [3] which defines conformance statements for the specification of managed objects.
2. Objects

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) [7] defined in the SMI. In particular, each object has a name, a syntax, and an encoding. The name is an object identifier, an administratively assigned name, which specifies an object type. 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 OBJECT DESCRIPTOR, to also refer to the object type.

The syntax of an object type defines the abstract data structure corresponding to that object type. The ASN.1 language is used for this purpose. However, the SMI RFC 1442 purposely restricts the ASN.1 constructs which may be used. These restrictions are explicitly made for simplicity.

The encoding of an object type is simply how that object type is represented using the object type’s syntax. Implicitly tied to the notion of an object type’s syntax and encoding is how the object type is represented when being transmitted on the network. The SMI specifies the use of the basic encoding rules of ASN.1 [8], subject to the additional requirements imposed by the SNMP.

2.1. Format of Definitions

Section 4 contains the specification of all object types contained in this MIB module. The object types are defined using the conventions defined in the SMI, as amended by the extensions specified in the SNMPv2 SMI.
3. Overview

SMDS is a service that can be provided by numerous interface protocols as shown in the following figure:

```
+-------------------+   +-------------------+
| SIP Level 3* [13] |   | SIP Level 3* [13] |
+-------------------+   +-------------------+
| SIP Level 2* [13] |   | DXI Level 2* [20] |
+-------------------+   +-------------------+
| SIP PLC* [14]    |   | DXI Level 1 [20]  |
+-------------------+   +-------------------+
| SIP Level 1 [14]  |   |                   |
+-------------------+   +-------------------+
          SIP based access        DXI based access
```

```
+-------------------+   +-------------------+
| SIP Level 3* [13] |   | SIP Level 3* [13] |
+-------------------+   +-------------------+
+-------------------+   +-------------------+
| ATM PLC [21]      |   |                   |
+-------------------+   +-------------------+
| ATM Level 1 [21]  |   | Level 1           |
+-------------------+   +-------------------+
          ATM based access        FR based access
```
In the figure below, managed objects for the protocol levels marked with a (*) are defined in this memo. Additional managed objects that must be used to manage SMDS interfaces are defined in other MIB modules as indicated in the figure.

With the improved interpretation of the MIB II interfaces group [9], some objects can be represented by ifTable. This means that these objects have been deprecated from the MIB module defined in RFC 1304, and ifTable is used instead. No semantical changes have been made to these objects. Only the object identifiers and object descriptors have been changed to the objects defined in ifTable.

Implementation experience has shown that the objects sipL3UnrecognizedIndividualDAs and sipL3UnrecognizedGAs were not supported.

3.1. SIP Level 3

Objects for SIP Level 3 apply to all methods to access SMDS shown in the figures above. With the improved interpretation of the MIB II interfaces group, most objects can be represented by ifTable. The appropriate mapping is defined below.
This document does not specify objects for the management of subscription or configuration of Subscriber-Network Interfaces (SNIs). Those objects are defined in Definitions of Managed Objects for SMDS Subcription [17]. Bellcore requirements on these objects are specified in TR-TSV-001062 [16].

<table>
<thead>
<tr>
<th>ifTable Object</th>
<th>Use for</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifIndex</td>
<td>Interface index.</td>
</tr>
<tr>
<td>ifDescr</td>
<td>Interface description. For example, SIP Level 3 sublayer of a SNI.</td>
</tr>
<tr>
<td>ifType</td>
<td>Set to 31.</td>
</tr>
<tr>
<td>ifMtu</td>
<td>Set to 9232.</td>
</tr>
<tr>
<td>ifSpeed</td>
<td>Peak bandwidth in bits per second available for use as provided by the supporting Level 2 protocol. For example, 1.17 Mbps when using SIP based DS1 SNIs, and 1.536 Mbps when using DXI-based DS1 DXI-SNI.</td>
</tr>
<tr>
<td>ifPhysAddress</td>
<td>OCTET STRING of Size 8. Value is a 16-digit Binary Coded Decimal SMDS address that is assigned to this interface.</td>
</tr>
<tr>
<td>ifAdminStatus</td>
<td>The desired administrative status of the SMDS interface.</td>
</tr>
<tr>
<td>ifOperStatus</td>
<td>The current operational status of the SMDS interface.</td>
</tr>
<tr>
<td>ifLastChange</td>
<td>The elapsed time since the last re-initialization of the interface. The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered prior to the last re-initialization of the local network management subsystem, then this object contains a zero value.</td>
</tr>
<tr>
<td>ifInOctets</td>
<td>Number of received octets at SIP Level 3. For SIP based SNIs, this is the number of sipL2ReceivedCounts multiplied by 44.</td>
</tr>
</tbody>
</table>
ifInUcastPkts  The total number of individually addressed SIP Level 3 PDUs received from the remote system across the SNI. The total includes only unerrored SIP Level 3 PDUs. [identical to RFC1304: sipL3ReceivedIndividualDAs]

ifInDiscards  The number of received SIP Level 3 PDUs discarded. For SMDS interfaces, this counter will always be zero.

ifInErrors  The total number of SIP Level 3 PDUs received from the remote system that were discovered to have errors (including protocol processing and bit errors but excluding addressing-related errors) and were discarded. Includes both group addressed SIP Level 3 PDUs and SIP Level 3 PDUs containing an individual destination address. [identical to RFC1304: sipL3Errors]

ifInUnknownProtos  The number of SIP Level 3 PDUs received from the remote system with a Source or Destination Address_Type subfields, (the four most significant bits of the 64 bit address field), not equal to the value 1100 or 1110. Also, an error is considered to have occurred if the Address_Type field for a Source Address is equal to 1110 (a group address). [identical to RFC1304: sipL3InvalidSMDSAddressTypes]

ifOutOctets  Number of received octets for transmission at SIP Level 3. For SIP based SNIs, this is the number of sipL2SentCounts multiplied by 44.

ifOutUcastPkts  The number of individually addressed SIP Level 3 PDUs that have been sent by this system across the interface. [identical to RFC1304: sipL3SentIndividualDAs]

ifOutDiscards  The number of SIP Level 3 PDUs discarded in the egress direction. For SMDS interfaces, this counter will always be zero.
ifOutErrors  The number of SIP Level 3 PDUs discarded in the egress direction, because of errors. For SMDS interfaces, this counter will always be zero.

ifName  The textual name of the interface. If not used, this variable contains a zero-length string.

ifInMulticastPkts  The total number of group addressed SIP Level 3 PDUs received from the remote system across the interface. The total includes only unerrored SIP Level 3 PDUs. [identical to RFC1304: sipL3ReceivedGAs]

ifInBroadcastPkts  This variable is not applicable for SMDS interfaces. Therefore, this counter is always zero.

ifOutMulticastPkts  The number of group addressed SIP Level 3 PDUs that have been sent by this system across the interface. [identical to RFC1304: sipL3SentGAs]

ifOutBroadcastPkts  This variable is not applicable for SMDS interfaces. Therefore, this counter is always zero.

ifLinkUpDownTrapEnable  The value of this object is disabled(2) for SIP Level 3 interfaces.

ifHighSpeed  Set to the user data rate of the interface in millions of bits per second. If the user data rate is less than 1 Mbps, then this value is zero.

ifPromiscuousMode  Set to false(2).

ifConnectorPresent  Set to false(2).

Consult the Evolution of the Interfaces Group [9] for when to use the HC (High Capacity) counters (e.g., ifHCInOctets is a 64-bit counter).
4. Object Definitions

SIP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Counter32,
    Integer32, IpAddress                     FROM SNMPv2-SMI
    TimeStamp, TEXTUAL-CONVENTION            FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP          FROM SNMPv2-CONF
    transmission, ifIndex, mib-2             FROM RFC1213-MIB;

-- This is the MIB module for the SMDS Interface objects.

sipMIB MODULE-IDENTITY
    LAST-UPDATED "9403311818Z"
    ORGANIZATION "IETF Interfaces Working Group"
    CONTACT-INFO
        "Tracy Brown
         Postal: Bell Communications Research
         331 Newman Springs Road
         P.O. Box 7020
         Red Bank, NJ  07701-7020
         US
         Tel: +1 908 758-2107
         Fax: +1 908 758-4177
         E-mail: tacox@mail.bellcore.com"
    "Kaj Tesink
     Postal: Bell Communications Research
     331 Newman Springs Road
     P.O. Box 7020
     Red Bank, NJ  07701-7020
     US
     Tel: +1 908 758 5254
     Fax: +1 908 758 4177
     E-mail: kaj@cc.bellcore.com."
    DESCRIPTION
        "The MIB module to describe
         SMDS interfaces objects."
    ::= { mib-2 36 }

SMDSAddress ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "1h:"
    STATUS current
    DESCRIPTION
        "The 60-bit SMDS address,
preceded by 4 bits with the following values:
1100 when representing an individual address
1110 when representing a group address."
SYNTAX OCTET STRING (SIZE (8))

IfIndex ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"The value of this object identifies the
interface for which this entry contains
management information. The value of this
object for a particular interface has the same
value as the ifIndex object, defined in RFC
1213, for the same interface."
SYNTAX Integer32

sip OBJECT IDENTIFIER ::= \{ transmission 31 \}
sipMIBObjects OBJECT IDENTIFIER ::= \{ sipMIB 1 \}

-- The SIP Level 3 Group

sipL3Table OBJECT-TYPE
SYNTAX SEQUENCE OF SipL3Entry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table contains SIP L3 parameters and
state variables, one entry per SIPL3 interface."
::= \{ sip 1 \}

sipL3Entry OBJECT-TYPE
SYNTAX SipL3Entry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This list contains SIP L3 parameters and
state variables."
INDEX \{ sipL3Index \}
::= \{ sipL3Table 1 \}

SipL3Entry ::= SEQUENCE {
  sipL3Index                        IfIndex,
  sipL3ReceivedIndividualDAs        Counter32,
  sipL3ReceivedGAs                  Counter32,
  sipL3UnrecognizedIndividualDAs    Counter32,
  sipL3UnrecognizedGAs              Counter32,

sipL3SentIndividualDAs Counter32,
sipL3SentGAs Counter32,
sipL3Errors Counter32,
sipL3InvalidSMDSAddressTypes Counter32,
sipL3VersionSupport Integer32
}

sipL3Index OBJECT-TYPE
SYNTAX IfIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of this object identifies the SIP L3 interface for which this entry contains management information."
 ::= { sipL3Entry 1 }

sipL3ReceivedIndividualDAs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
-- Moved to ifTable
-- ifInUcastPkts defined in [9] must be used instead.
DESCRIPTION
"The total number of individually addressed SIP Level 3 PDUs received from the remote system across the SNI. The total includes only unerrored L3PDUs."
 ::= { sipL3Entry 2 }

sipL3ReceivedGAs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
-- Moved to ifTable
-- ifInMulticastPkts defined in [9] must be used instead.
DESCRIPTION
"The total number of group addressed SIP Level 3 PDUs received from the remote system across the SNI. The total includes only unerrored L3PDUs."
 ::= { sipL3Entry 3 }

sipL3UnrecognizedIndividualDAs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of SIP Level 3 PDUs received from the
remote system with invalid or unknown individual
destination addresses (Destination Address
Screening violations are not included). See SMDS
Subscription MIB module."
 ::= { sipL3Entry 4 }

sipL3UnrecognizedGAs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of SIP Level 3 PDUs received from the
remote system with invalid or unknown group
addresses. (Destination Address Screening
violations are not included). See SMDS
Subscription MIB module."
 ::= { sipL3Entry 5 }

sipL3SentIndividualDAs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
-- Moved to ifTable
-- ifOutUcastPkts defined in [9] must be used instead.
DESCRIPTION
"The number of individually addressed SIP Level 3
PDUs that have been sent by this system across the
SNI."
 ::= { sipL3Entry 6 }

sipL3SentGAs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
-- Moved to ifTable
-- ifOutMulticastPkts defined in [9] must be used instead.
DESCRIPTION
"The number of group addressed SIP L3PDUs that
have been sent by this system across the SNI."
 ::= { sipL3Entry 7 }

-- The total number of SIP L3PDU errors can be calculated as
-- (Syntactic errors + Semantic Service errors)
-- Syntactic errors include:
-- sipL3Errors
-- Latest occurrences of syntactic error types are logged in
-- sipL3PDUErrorTable.
-- Semantic Service errors include:
Note that public networks supporting SMDS may discard SIP L3PDUs due to subscription violations. Related managed objects are defined in Definitions of Managed Objects for SMDS Subscription.

```
sipL3Errors OBJECT-TYPE
   SYNTAX        Counter32
   MAX-ACCESS    read-only
   STATUS        deprecated
   -- Moved to ifTable
   -- ifInErrors defined in [9] must be used instead.
   DESCRIPTION  
      "The total number of SIP Level 3 PDUs received from the remote system that were discovered to have errors (including protocol processing and bit errors but excluding addressing-related errors) and were discarded. Includes both group addressed L3PDUs and L3PDUs containing an individual destination address."
   ::= { sipL3Entry 8 }
```

```
sipL3InvalidSMDSAddressTypes OBJECT-TYPE
   SYNTAX        Counter32
   MAX-ACCESS    read-only
   STATUS        deprecated
   -- Moved to ifTable
   -- ifInUnknownProtos defined in [9] must be used instead.
   DESCRIPTION  
      "The number of SIP Level 3 PDUs received from the remote system that had the Source or Destination Address_Type subfields, (the four most significant bits of the 64 bit address field), not equal to the value 1100 or 1110. Also, an error is considered to have occurred if the Address_Type field for a Source Address, the four most significant bits of the 64 bits, is equal to 1110 (a group address)."
   ::= { sipL3Entry 9 }
```

```
sipL3VersionSupport  OBJECT-TYPE
   SYNTAX            Integer32
   MAX-ACCESS        read-only
   STATUS            current
   DESCRIPTION       
      "A value which indicates the version(s) of SIP
```
that this interface supports. The value is a sum. This sum initially takes the value zero. For each version, V, that this interface supports, 2 raised to \((V - 1)\) is added to the sum. For example, a port supporting versions 1 and 2 would have a value of \((2^{(1-1)} + 2^{(2-1)})\)=3. The sipL3VersionSupport is effectively a bit mask with Version 1 equal to the least significant bit (LSB)."

::= { sipL3Entry 10 }

-- The SIP Level 2 Group

sipL2Table OBJECT-TYPE
SYNTAX SEQUENCE OF SipL2Entry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "This table contains SIP L2PDU parameters and state variables, one entry per SIP L2 interface."
::= { sip 2 }

sipL2Entry OBJECT-TYPE
SYNTAX SipL2Entry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "This list contains SIP L2 parameters and state variables."
INDEX { sipL2Index }
::= { sipL2Table 1 }

SipL2Entry ::= SEQUENCE {
    sipL2Index                     IfIndex,
    sipL2ReceivedCounts            Counter32,
    sipL2SentCounts                Counter32,
    sipL2HcsOrCRCErrors            Counter32,
    sipL2PayloadLengthErrors       Counter32,
    sipL2SequenceNumberErrors      Counter32,
    sipL2MidCurrentlyActiveErrors  Counter32,
    sipL2BomOrSSMsMIDErrors        Counter32,
    sipL2EomsMIDErrors             Counter32
}

sipL2Index OBJECT-TYPE
SYNTAX IfIndex
MAX-ACCESS read-only
The value of this object identifies the SIP interface for which this entry contains management information.

::= { sipL2Entry 1 }

sipL2ReceivedCounts OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The number of SIP Level 2 PDUs received from the remote system across the SNI. The total includes only unerrored L2PDUs."

::= { sipL2Entry 2 }

sipL2SentCounts OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The number of SIP Level 2 PDUs that have been sent by this system across the SNI."

::= { sipL2Entry 3 }

-- The following error types are counted, and
-- preclude sipL2ReceivedCounts to be incremented:
--  sipL2HcsOrCRCErrors
--  sipL2PayloadLengthErrors
--  sipL2SequenceNumberErrors
--  sipL2BomOrSSMsMIDErrors
--  sipL2EomsMIDErrors
-- The receipt of SIP Level 2 PDUs which are BOMs and
-- for with a MID that is already active will cause
-- sipL2MidCurrentlyActiveErrors to increment.
-- Any already accumulated (correct) segmentation
-- units are discarded. The sipL2ReceivedCounts
-- is incremented by 1. Thus,
-- sipL2ReceivedCounts defines the number of
-- correct SIP Level 2 PDUs delivered to the reassembly
-- process.

sipL2HcsOrCRCErrors  OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION

// Remaining objects and their descriptions are omitted for brevity.
"The number of received SIP Level 2 PDUs that were
discovered to have either a Header Check Sequence error or a Payload CRC violation."
::= { sipL2Entry 4 }

sipL2PayloadLengthErrors  OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of received SIP Level 2 PDUs that had
Payload Length errors that fall in the following specifications:
- SSM L2_PDU payload length field value less
  than 28 octets or greater than 44 octets,
- BOM or COM L2_PDU payload length field not
equal to 44 octets,
- EOM L2_PDU payload length field value less
  than 4 octets or greater than 44 octets."
::= { sipL2Entry 5 }

sipL2SequenceNumberErrors  OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of received SIP Level 2 PDUs that had
a sequence number within the L2PDU not equal to
the expected sequence number of the SMDS SS receive process."
::= { sipL2Entry 6 }

sipL2MidCurrentlyActiveErrors  OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of received SIP Level 2 PDUs that are
BOMs for which an active receive process is
already started."
::= { sipL2Entry 7 }

sipL2BomOrSSMsMIDErrors  OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of received SIP Level 2 PDUs that are SSMs with a MID not equal to zero or are BOMs with MIDs equal to zero."
 ::= { sipL2Entry 8 }

sipL2EomsMIDErrors OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The number of received SIP Level 2 PDUs that are EOMs for which there is no active receive process for the MID (i.e., the receipt of an EOM which does not correspond to a BOM) OR the EOM has a MID equal to zero."
 ::= { sipL2Entry 9 }

-- The SIP PLCP Group

sipPLCP OBJECT IDENTIFIER ::= { sip 3 }

-- The DS1 PLCP Group

sipDS1PLCPTable OBJECT-TYPE
SYNTAX SEQUENCE OF SipDS1PLCPEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "This table contains SIP DS1 PLCP parameters and state variables, one entry per SIP port."
 ::= { sipPLCP 1 }

sipDS1PLCPEntry OBJECT-TYPE
SYNTAX SipDS1PLCPEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "This list contains SIP DS1 PLCP parameters and state variables."
INDEX { sipDS1PLCPIndex }
 ::= { sipDS1PLCPTable 1 }

SipDS1PLCPEntry ::= SEQUENCE {
 sipDS1PLCPIndex IfIndex,
 sipDS1PLCSEFSs Counter32,
 sipDS1PLCPAlarmState INTEGER,
sipDS1PLCPUASs OBJECT-TYPE
SYNTAX Counter32

sipDS1PLCPIndex OBJECT-TYPE
SYNTAX IfIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The value of this object identifies the interface for which this entry contains management information."
::= { sipDS1PLCPEntry 1 }

sipDS1PLCPSEFSs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "A DS1 Severely Errored Framing Second (SEFS) is a count of one-second intervals containing one or more SEF events. A Severely Errored Framing (SEF) event is declared when an error in the A1 octet and an error in the A2 octet of a framing octet pair (i.e., errors in both framing octets), or two consecutive invalid and/or nonsequential Path Overhead Identifier octets are detected."
::= { sipDS1PLCPEntry 2 }

sipDS1PLCPAlarmState OBJECT-TYPE
SYNTAX INTEGER
  noAlarm (1),
  receivedFarEndAlarm (2),
  incomingLOF (3)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "This variable indicates if there is an alarm present for the DS1 PLCP. The value receivedFarEndAlarm means that the DS1 PLCP has received an incoming Yellow Signal, the value incomingLOF means that the DS1 PLCP has declared a loss of frame (LOF) failure condition, and the value noAlarm means that there are no alarms present. See TR-TSV-000773 for a description of alarm states."
::= { sipDS1PLCPEntry 3 }
sipDS1PLCPUASs OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The counter associated with the number of
Unavailable Seconds, as defined by TR-TSV-000773,
encountered by the PLCP."
::= { sipDS1PLCPEntry 4 }

-- The DS3 PLCP Group

sipDS3PLCPTable  OBJECT-TYPE
SYNTAX      SEQUENCE OF SipDS3PLCPEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"This table contains SIP DS3 PLCP parameters and
state variables, one entry per SIP port."
::= { sipPLCP 2 }

sipDS3PLCPEntry  OBJECT-TYPE
SYNTAX      SipDS3PLCPEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"This list contains SIP DS3 PLCP parameters and
state variables."
INDEX   { sipDS3PLCPIndex }
::= { sipDS3PLCPTable 1 }

SipDS3PLCPEntry ::= SEQUENCE {
  sipDS3PLCPIndex       IfIndex,
  sipDS3PLCPSEFSs       Counter32,
  sipDS3PLCPAlarmState  INTEGER,
  sipDS3PLCPUASs        Counter32
}

sipDS3PLCPIndex  OBJECT-TYPE
SYNTAX      IfIndex
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The value of this object identifies the
interface for which this entry contains management
information."
::= { sipDS3PLCPEntry 1 }
sipDS3PLCPSEFSs OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"A DS3 Severely Errored Framing Second (SEFS) is a count of one-second
intervals containing one or more SEF events. A Severely Errored Framing
(SEF) event is declared when an error in the A1 octet and an error in the A2
octet of a framing octet pair (i.e., errors in both framing octets), or two
consecutive invalid and/or nonsequential Path Overhead Identifier octets
are detected."
::= { sipDS3PLCPEntry 2 }

sipDS3PLCPAlarmState OBJECT-TYPE
SYNTAX      INTEGER     {
     noAlarm (1),
     receivedFarEndAlarm (2),
     incomingLOF (3)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"This variable indicates if there is an alarm present for the DS3 PLCP. The
value receivedFarEndAlarm means that the DS3 PLCP has received an
incoming Yellow Signal, the value incomingLOF means that the DS3 PLCP
has declared a loss of frame (LOF) failure condition, and the value
noAlarm means that there are no alarms present. See TR-TSV-000773 for
a description of alarm states."
::= { sipDS3PLCPEntry 3 }

sipDS3PLCPUASs OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The counter associated with the number of Unavailable Seconds, as defined by
TR-TSV-000773, encountered by the PLCP."
::= { sipDS3PLCPEntry 4 }

-- The SMDS Applications group
-- Applications that have been identified for this group are:
smdsApplications OBJECT IDENTIFIER ::= { sip 4 }

ipOverSMDS OBJECT IDENTIFIER ::= { smdsApplications 1 }

Although the objects in this group are read-only, at the agent’s discretion they may be made read-write so that the management station, when appropriately authorized, may change the addressing information related to the configuration of a logical IP subnetwork implemented on top of SMDS.

This table is necessary to support RFC1209 (IP-over-SMDS) and gives information on the Group Addresses and ARP Addresses used in the Logical IP subnetwork. One SMDS address may be associated with multiple IP addresses. One SNI may be associated with multiple LISs.

ipOverSMDSTable OBJECT-TYPE
SYNTAX SEQUENCE OF IpOverSMDSEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The table of addressing information relevant to this entity’s IP addresses."
::= { ipOverSMDS 1 }

ipOverSMDSEntry OBJECT-TYPE
SYNTAX IpOverSMDSEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The addressing information for one of this entity’s IP addresses."
INDEX { ipOverSMDSIndex, ipOverSMDSAddress }
::= { ipOverSMDSTable 1 }

IpOverSMDSEntry ::= 
SEQUENCE {
  ipOverSMDSIndex        IfIndex,
  ipOverSMDSAddress      IpAddress,
  ipOverSMDSHA           SMDSAddress,
  ipOverSMDSLISGA        SMDSAddress,
  ipOverSMDSARPReq       SMDSAddress
}

ipOverSMDSIndex OBJECT-TYPE
SYNTAX IfIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of this object identifies the
interface for which this entry contains management
information."
::= { ipOverSMDSEntry 1 }

ipOverSMDSAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The IP address to which this entry’s addressing
information pertains."
::= { ipOverSMDSEntry 2 }

ipOverSMDSHA OBJECT-TYPE
SYNTAX SMDSAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The SMDS Individual address of the IP station."
::= { ipOverSMDSEntry 3 }

ipOverSMDSLISGA OBJECT-TYPE
SYNTAX SMDSAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The SMDS Group Address that has been configured
to identify the SMDS Subscriber-Network Interfaces
(SNIs) of all members of the Logical IP Subnetwork
(LIS) connected to the network supporting SMDS."
::= { ipOverSMDSEntry 4 }

ipOverSMDSARPReq OBJECT-TYPE
SYNTAX SMDSAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The SMDS address (individual or group) to which
ARP Requests are to be sent."
::= { ipOverSMDSEntry 5 }

-- The SMDS Carrier Selection group
-- This group is used as a place holder
-- for carrier selection objects.

smdsCarrierSelection OBJECT IDENTIFIER ::= { sip 5 }

-- The SIP Error Log

sipErrorLog OBJECT IDENTIFIER ::= { sip 6 }

sipL3PDUErrorTable OBJECT-TYPE
SYNTAX      SEQUENCE OF SipL3PDUErrorEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "A table that contains the latest occurrence of
  the following syntactical SIP L3PDU errors:

  - Destination Address Field Format Error,

  The following pertains to the 60 least significant
  bits of the 64 bit address field. The 60 bits
  contained in the address subfield can be used to
  represent addresses up to 15 decimal digits. Each
decimal digit shall be encoded into four bits
using Binary Coded Decimal (BCD), with the most
significant digit occurring left-most. If not all
15 digits are required, then the remainder of this
field shall be padded on the right with bits set
to one. An error is considered to have occurred:
a). if the first four bits of the address
subfield are not BCD, OR b). if the first four
bits of the address subfield are populated with
the country code value 0001, AND the 40 bits which
follow are not Binary Coded Decimal (BCD) encoded
values of the 10 digit addresses, OR the remaining
16 least significant bits are not populated with
1’s, OR c). if the address subfield is not

  - Source Address Field Format Error,

  The description of this parameter is the same as
  the description of the Destination Address Field
  Format Error.
- **Invalid BAsize Field Value,**

An error is considered to have occurred when the BAsize field of an SIP L3PDU contains a value less that 32, greater than 9220 octets without the CRC32 field present, greater than 9224 octets with the CRC32 field present, or not equal to a multiple of 4 octets,

- **Invalid Header Extension Length Field Value,**

An error is considered to have occurred when the Header Extension Length field value is not equal 3.

- **Invalid Header Extension - Element Length,**

An error is considered to have occurred when the Header Extension - Element Length is greater than 12.

- **Invalid Header Extension - Version Element Position, Length, or Value,**

An error is considered to have occurred when a Version element with Length=3, Type=0, and Value=1 does not appear first within the Header Extension, or an element Type=0 appears somewhere other than within the first three octets in the Header Extension.

- **Invalid Header Extension - Carrier Selection Element Position, Length, Value or Format,**

An error is considered to have occurred when a Carrier Selection element does not appear second within the Header Extension, if the Element Type does not equal 1, the Element Length does not equal 4, 6, or 8, the Element Value field is not four BCD encoded decimal digits used in specifying the Carrier Identification Code (CIC), or the identified CIC code is invalid.

- **Header Extension PAD Error**

An error is considered to have occurred when the Header Extension PAD is 9 octets in length, or if the Header Extension PAD is greater than zero
octets in length and the Header Extension PAD does not follow all Header Extension elements or does not begin with at least one octet of all zeros.

- BEtag Mismatch Error,

An error is considered to have occurred when the Beginning-End Tags in the SIP L3PDU header and trailer are not equal.

- BAsize Field not equal to Length Field Error,

An error is considered to have occurred when the value of the BAsize Field does not equal the value of the Length Field.

- Incorrect Length Error, and

An error is considered to have occurred when the Length field value is not equal to the portion of the SIP L3PDU which extends from the Destination Address field up to and including the CRC32 field (if present) or up to and including the PAD field (if the CRC32 field is not present). As an optional check, an error is considered to have occurred when the length of a partially received SIP L3PDU exceeds the BAsize value.

- MRI Timeout Error.

An error is considered to have occurred when the elapsed time between receipt of BOM and corresponding EOM exceeds the value of the MRI (Message Receive Interval) for a particular transport signal format.

An entry is indexed by interface number and error type, and contains Source Address, Destination Address and a timestamp. All these errors are counted in the sipL3Errors counter. When sipL3PDUErrorTimeStamp is equal to zero, the SipL3PDUErrorEntry does not contain any valid information.

::= { sipErrorLog 1 }

sipL3PDUErrorEntry OBJECT-TYPE
SYNTAX SipL3PDUErrorEntry
MAX-ACCESS not-accessible
SipL3PDUErrorEntry ::= SEQUENCE {
  sipL3PDUErrorIndex       IfIndex,
  sipL3PDUErrorType        INTEGER,
  sipL3PDUErrorSA          SMDSAddress,
  sipL3PDUErrorDA          SMDSAddress,
  sipL3PDUErrorTimeStamp   TimeStamp
}

sipL3PDUErrorIndex OBJECT-TYPE
SYNTAX     IfIndex
MAX-ACCESS read-only
STATUS     current
DESCRIPTION "The value of this object identifies the
  interface for which this entry contains management
  information."
 ::= { sipL3PDUErrorEntry 1 }

sipL3PDUErrorType OBJECT-TYPE
SYNTAX     INTEGER {
  erroredDAFieldFormat (1),
  erroredSAFieldFormat (2),
  invalidBAsizeFieldValue (3),
  invalidHdrExtLength (4),
  invalidHdrExtElementLength (5),
  invalidHdrExtVersionElementPositionLenghtOrValue (6),
  invalidHdrExtCarSelectElementPositionLengthValueOrFormat (7),
  hePADError (8),
  beTagMismatch (9),
  baSizeFieldNotEqualToLengthField (10),
  incorrectLength (11),
  mriTimeout (12)
}
MAX-ACCESS read-only
STATUS     current
DESCRIPTION "The type of error."
 ::= { sipL3PDUErrorEntry 2 }

sipL3PDUErrorSA OBJECT-TYPE
SYNTAX     SMDSAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "A rejected SMDS source address."
::= { sipL3PDUErrorEntry 3 }

sipL3PDUErrorDA OBJECT-TYPE
SYNTAX SMDSAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION "A rejected SMDS destination address."
::= { sipL3PDUErrorEntry 4 }

sipL3PDUErrorTimeStamp OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The timestamp for the service disagreement. The
timestamp contains the value of sysUpTime at the
latest occurrence of this type of service
disagreement. See textual description under
sipL3PDUErrorTable for boundary conditions."
::= { sipL3PDUErrorEntry 5 }

-- The DXI Group

sipDxiTable OBJECT-TYPE
SYNTAX SEQUENCE OF SipDxiEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The DXI table."
::= { sipMIBObjects 1 }

sipDxiEntry OBJECT-TYPE
SYNTAX SipDxiEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry in the DXI table."
INDEX { ifIndex }
::= { sipDxiTable 1 }

SipDxiEntry ::= SEQUENCE {
  sipDxiCrc
INTEGER,
sipDxiOutDiscards
  Counter32,
sipDxiInErrors
  Counter32,
sipDxiInAborts
  Counter32,
sipDxiInTestFrames
  Counter32,
sipDxiOutTestFrames
  Counter32,
sipDxiHbpNoAcks
  Counter32
  }

sipDxiCrc OBJECT-TYPE
SYNTAX INTEGER {
  crc16(1),
  crc32(2)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of this object indicates the type
  of Frame Checksum used by DXI. Current
  choices include CCITT CRC16 or CRC32."
::= { sipDxiEntry 1 }

sipDxiOutDiscards OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of outbound frames discarded
  because of congestion."
::= { sipDxiEntry 2 }

sipDxiInErrors OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of inbound frames discarded
  because of errors such as frame checksum
  (CRC) violations, non-integral number of octets, address
  and control field violations, and frame size errors."
::= { sipDxiEntry 3 }

sipDxiInAborts  OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The number of inbound frames discarded
because of an abort bit sequence (1111111)
received before closing flag."
::= { sipDxiEntry 4 }

sipDxiInTestFrames    OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The number of unerrored,
inbound Test frames received
(generally as part of Heart
Beat Poll procedure)."
::= { sipDxiEntry 5 }

sipDxiOutTestFrames   OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The number of unerrored,
outbound Test frames sent
(generally as part of Heart
Beat Poll procedure)."
::= { sipDxiEntry 6 }

sipDxiHbpNoAcks  OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The number of Heart Beat
Poll (HBP) No Ack timeouts."
::= { sipDxiEntry 7 }

-- conformance information

smdsConformance OBJECT IDENTIFIER ::= { sipMIB 2 }
smdsGroups OBJECT IDENTIFIER ::= { smdsConformance 1 }
smdsCompliances OBJECT IDENTIFIER ::= { smdsConformance 2 }

-- compliance statements

smdsCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
  "The compliance statement for SMDS interfaces."

  MODULE -- this module
    MANDATORY-GROUPS { sipLevel3Stuff }

    GROUP sipLevel2Stuff
    DESCRIPTION
    "This group is mandatory only for those interfaces (SNIs) which run SIP Level 2."

    GROUP sipDS1PLCPStuff
    DESCRIPTION
    "This group is mandatory only for those interfaces (SNIs) which run the DS1 PLCP."

    GROUP sipDS3PLCPStuff
    DESCRIPTION
    "This group is mandatory only for those interfaces (SNIs) which run the DS3 PLCP."

    GROUP sipIPApplicationsStuff
    DESCRIPTION
    "This group is mandatory only for interfaces operating IP over SMDS in accordance with RFC1209."

    GROUP sipDxiStuff
    DESCRIPTION
    "This group is mandatory only for those interfaces (DXI-SNI) which run the DXI protocol."
  ::= { smdsCompliances 1 }

-- units of conformance

sipLevel3Stuff OBJECT-GROUP
  OBJECTS { sipL3Index,
            sipL3VersionSupport, sipL3PDUErrorIndex,
            sipL3PDUErrorType,
sipL3PDUErrorSA, sipL3PDUErrorDA,
sipL3PDUErrorTimeStamp }
STATUS current
DESCRIPTION
"A collection of objects providing information
applicable to all SMDS interfaces."
::= { smdsGroups 1 }

sipLevel2Stuff OBJECT-GROUP
OBJECTS { sipL2Index, sipL2HcsOrCRCErrors,
sipL2PayloadLengthErrors,
sipL2SequenceNumberErrors,
sipL2MidCurrentlyActiveErrors,
sipL2BomOrSSMsMIDErrors,
sipL2EomsMIDErrors }
STATUS current
DESCRIPTION
"A collection of objects providing information
specific to interfaces using the SIP Level 2."
::= { smdsGroups 2 }

sipDS1PLCPStuff OBJECT-GROUP
OBJECTS { sipDS1PLCPIndex, sipDS1PLCPSEFSs,
sipDS1PLCPAlarmState, sipDS1PLCPUASs }
STATUS current
DESCRIPTION
"A collection of objects providing information
specific to interfaces using the DS1 PLCP."
::= { smdsGroups 3 }

sipDS3PLCPStuff OBJECT-GROUP
OBJECTS { sipDS3PLCPIndex, sipDS3PLCPSEFSs,
sipDS3PLCPAlarmState, sipDS3PLCPUASs }
STATUS current
DESCRIPTION
"A collection of objects providing information
specific to interfaces using the DS3 PLCP."
::= { smdsGroups 4 }

sipIPApplicationsStuff OBJECT-GROUP
OBJECTS { ipOverSMDSIndex, ipOverSMDSAddress,
           ipOverSMDSHA, ipOverSMDSLISGA, ipOverSMDSARPReq }
STATUS current
DESCRIPTION
"A collection of objects providing information
for running IP over SMDS."
::= { smdsGroups 5 }
sipDxiStuff OBJECT-GROUP

OBJECTS { sipDxiCrc, sipDxiOutDiscards, sipDxiInErrors, sipDxiInAborts, sipDxiInTestFrames, sipDxiOutTestFrames, sipDxiHbpNoAcks }

STATUS current

DESCRIPTION "A collection of objects providing information specific to interfaces using the DXI protocol."

::= { smdsGroups 6 }

END

5. Acknowledgments

This specification is a product of the ifMIB Working Group.

6. References


7. Security Considerations

Security issues are not discussed in this memo.
8. Authors’ Addresses

Tracy A. Brown
Bell Communications Research
331 Newman Springs Road
P.O. Box 7020
Red Bank, NJ  07701-7020
Phone: (908) 758-2107
EMail: tacox@mail.bellcore.com

Kaj Tesink
Bell Communications Research
331 Newman Springs Road
P.O. Box 7020
Red Bank, NJ  07701-7020
Phone: (908) 758-5254
EMail: kaj@cc.bellcore.com