Internet Engineering Task Force
INTERNET DRAFT
Expires May 2001

Hans Sjostrand
Ericsson
Joachim Buerkle
Nortel Networks
Balaji Srinivasan
Cplane

November 2000

Definitions of Managed Objects for the General Switch Management Protocol (GSMP)

< draft-ietf-gsmp-mib-03.txt >

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of Section 10 of RFC2026.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet- Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at http://www.ietf.org/ietf/1id-abstracts.txt

The list of Internet-Draft Shadow Directories can be accessed at http://www.ietf.org/shadow.html.

Distribution of this document is unlimited. Please send comments to the General Switch Management Protocol (gsmp) Working Group, <gsmp@psyton.com>.

Copyright Notice

Copyright (C) The Internet Society (1999). All Rights Reserved.

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for the General Switch Management Protocol (GSMP).

Table of Contents

1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for the General Switch Management Protocol (GSMP).

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

2. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

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

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

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

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

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

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

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

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

3. Structure of the MIB

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for the General Switch Management Protocol (GSMP) as defined in [GSMPv3].

3.1 Scope

The GSMP mib is a protocol mib. It contains object to configure, monitor and maintain the GSMP protocol agent. It does not provide any information learned via the protocol, such as "all ports config" information.

The relationships between virtual entities, such as Virtual Switch Entities, and entities, such as Switch Entities, falls outside of the management of GSMP. This also applies for the management of switch partitions. So this is excluded from the GSMP mib.

It is possible to configure which and how many Switch Controllers that are controlling one Switch since every potential session with the switch has to be represented with an Switch entity. It is however not possible to define that one Switch Controller shouldn't allow other Switch controllers to control the same switch or partition on the switch. It is assumed that there are mechanisms that synchronise controllers and the configuration of them. This is outside the scope of this mib.

3.2 Overview

Each instance of a switch controller - switch partition adjacency is a session between a switch controller entity and a switch entity. The MIB provides objects to configure/setup these entities to form the GSMP sessions.

Two tables are used to configure potential GSMP sessions depending if you are acting as a GSMP switch controller or a GSMP switch. Each row in these tables initiates a GSMP session. To create a Switch Entity, an entry in the gsmpSwitchTable is created. To create a Switch Controller Entity, an entry in the gsmpControllerTable is created.

In order to define and configure what encapsulation the potential GSMP session shall use, the gsmpControllerEncapType or gsmpSwitchEncapType object in the respective tables is set to ethernet, atm or tcp/ip. If atm is used, a row in the gsmpAtmEncapTable has to be created with the same index as in the controller or switch table. If tcp/ip is used, a row in the

gsmpTcpIpEncapTable has to be created with the same index as in the controller or switch table. No extra encapsulation info is needed if ethernet is used.

Another table, the gsmpSessionTable, shows the actual sessions that are established or are in the process of being established. Each row represents a specific session between an Entity and a peer. This table carries information about the peer, the session and parameters that was negotiated by the adjacency procedures. The gsmpSessionTable also contains statistical information regarding the session.

3.3 MIB groups

3.3.1 GSMP Switch Controller group

The controller group is used to configure a potential GSMP session on a Switch Controller. A row in the gsmpControllerTable is created for each such session. If ATM or TCP/IP encapsulation is used a corresponding row has to be created in these tables before the session adjacency protocol is initiated.

The encapsulation used is specified in the gsmpControllerEncapType object. If ATM or TCP/IP is used, further encapsulation data is defined in the corresponding encapsulation tables. If ethernet is used the MAC address of the interface defined for the session is set by the Controller ID object.

The adjacency parameters are defined; such as
- Max supported GSMP version
¡ Time between the periodic adjacency messages
¡ Controller local port number and instance number.
¡ Whether partitions are being used and the partition ID for the specific partitions this controller is concerned with if partitions are used.
¡ The resynchronisation strategy for the session is specified.

The notification mapping is set to specify for with events the corresponding SNMP notifications are sent.

3.3.2 GSMP Switch group

The switch group is used to configure a potential GSMP session on a Switch. A row in the gsmpSwitchTable is created for each such session. If ATM or TCP/IP encapsulation is used a corresponding row has to be created in these tables before the session adjacency protocol is initiated.

The encapsulation used is specified in the gsmpSwitchEncapType object. If ATM or TCP/IP is used, further encapsulation data is defined in the corresponding encapsulation tables. If ethernet is used the MAC address of the interface defined for the session is set by the Switch ID object.

The adjacency parameters are defined; such as
- Max supported GSMP version
¡ Time between the periodic adjacency messages
¡ Switch Name, local port number and instance number.
¡ Whether partitions are being used and the partition ID for this specific partition if partitions are used.
- The switch type could be set.
- The suggested maximum window size for unacknowledged request messages.

Also, a notification mapping is set to specify for with events the corresponding SNMP notifications are sent.

3.3.3 GSMP Encapsulation groups

The ATM Encapsulation Table and the TCP/IP Encapsulation Table provides a way to configure information that are encapsulation specific. The encapsulation data is further specified in [GSMPenc].

If ATM encapsulation is used, the interface and the virtual channel are specified.

If TCP/IP is used, the IP address (or DNS address) and the port number are specified.

No special config data needed if Ethernet encapsulation is used.

3.3.4 GSMP General group

The GSMP session table provides a way to monitor and maintain GSMP sessions.

The session is defined by a Switch Controller Entity and Switch Entity pair.

3.3.5 The GSMP Notifications Group

The GSMP Notification Group defines notifications for GSMP entities. These notifications provide a mechanism for a GSMP device to inform the management station of status changes. Also a notification is defined for each type of GSMP events. To disable or enable sending of each notification is done by setting the bitmap accordingly in the

Notification mapping objects in the Controller Entity or Switch Entity tables.

The group of notifications consists of the following notifications:

- gsmpSessionDownTrap

This notification is generated when a session is terminating and also reports the final accounting statistics of the session.

- gsmpSessionUpTrap

This notification is generated when a new session is established.

- gsmpSendFailureIndTrap

This notification is generated when a message with a failure indication was sent. This means that this notification identifies a change to the gsmpSessionStatFailureIndication object in a row of the gsmpSessionTable.

- gsmpReceivedFailureIndTrap

This notification is generated when a message with a failure indication received. This means that this notification identifies a change to the gsmpSessionStatReceivedFailure object in a row of the gsmpSessionTable.

- gsmpPortUpEventTrap

This notification is generated when a Port Up Event is either received or sent.

- gsmpPortDownEventTrap

This notification is generated when a Port Down Event is either received or sent.

- gsmpInvalidLabelEventTrap

This notification is generated when an Invalid Label Event is either received or sent.

- gsmpNewPortEventTrap

This notification is generated when New Port Event either is received or sent.

- gsmpDeadPortEventTrap

This notification is generated when a Dead Port Event is either received or sent.

- gsmpAdjacencyUpdateEventTrap

This notification is generated when an Adjacency Update Event is either received or sent.

3.4 Textual Conventions

The datatypes GsmpNameType, GsmpPartitionType, GsmpPartitionIdType and GsmpEncapType are used as textual conventions in this document. These textual conventions have NO effect on neither the syntax nor the semantics of any managed object. Objects defined using these conventions are always encoded by means of the rules that define their primitive type. Hence, no changes to the SMI or the SNMP are necessary to accommodate these textual conventions which are adopted merely for the convenience of readers.

4. GSMP MIB Definitions

```
GSMP-MIB DEFINITIONS ::= BEGIN

     IMPORTS
         OBJECT-TYPE, MODULE-IDENTITY, NOTIFICATION-TYPE,
         Unsigned32, Integer32, Counter32, mib-2
             FROM SNMPv2-SMI                          -- RFC2578
         RowStatus, TruthValue, TimeStamp, TEXTUAL-CONVENTION
             FROM SNMPv2-TC                           -- RFC2579
         MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
             FROM SNMPv2-CONF                         -- RFC2580
         InterfaceIndex
             FROM IF-MIB                              -- RFC2233
         AtmVcIdentifier, AtmVpIdentifier
             FROM ATM-TC-MIB                          -- RFC2514
         InetAddressType, InetAddress
             FROM INET-ADDRESS-MIB                    -- RFC2851
         ;

     gsmpMIB MODULE-IDENTITY
         LAST-UPDATED "200011130900Z" -- 13 November 2000, 10.00 MET
         ORGANIZATION "General Switch Management Protocol (gsmp)
                       Working Group, IETF"
         CONTACT-INFO
             "WG Chair: Avri Doria
              Email:    avri@nortelnetworks.com
```

```
             WG Chair: Kenneth Sundell
             Email:    ksundell@nortelnetworks.com

             Editor:   Hans Sjostrand
             Email:    hans.sjostrand@ericsson.com

             Editor:   Joachim Buerkle
             Email:    joachim.buerkle@nortelnetworks.com

             Editor:   Balaji Srinivasan
             Email:    balaji@cplane.com"
         DESCRIPTION
             "This MIB contains managed object definitions for the
             General Switch Management Protocol, GSMP, version 3"
     ::= { mib-2 XXX }

     gsmpObjects             OBJECT IDENTIFIER ::= { gsmpMIB 1 }
     gsmpNotifications       OBJECT IDENTIFIER ::= { gsmpMIB 2 }
     gsmpConformance         OBJECT IDENTIFIER ::= { gsmpMIB 3 }

     --****************************************************************
     -- GSMP Textual Conventions
     --****************************************************************

     GsmpNameType ::= TEXTUAL-CONVENTION
         STATUS      current
         DESCRIPTION
             "The Name is a 48-bit quantity.
             A 48-bit IEEE 802 MAC address, if
             available, may be used."
         SYNTAX        OCTET STRING (SIZE(6))

    GsmpPartitionType ::= TEXTUAL-CONVENTION
        STATUS        current
        DESCRIPTION
            "Defining if partitions are used and how the partition id
            is negotiated. "
        SYNTAX        INTEGER {
                               noPartition(1),
                               fixedPartitionRequest(2),
                               fixedPartitionAssigned(3)
                              }

     GsmpPartitionIdType ::= TEXTUAL-CONVENTION
         STATUS      current
         DESCRIPTION
             "A 8-bit quantity. The format of the Partition ID is not
             defined in GSMP. If desired, the Partition ID can be
             divided into multiple sub-identifiers within a single
```

```
            partition. For example: the Partition ID could be
            subdivided into a 6-bit partition number and a 2-bit
            sub-identifier which would allow a switch to support 64
            partitions with 4 available IDs per partition."
        SYNTAX      OCTET STRING (SIZE(1))

    GsmpEncapType  ::= TEXTUAL-CONVENTION
        STATUS        current
        DESCRIPTION
            "The encapsulation types defined for GSMP."
        SYNTAX        INTEGER {
                               ethernet(1),
                               atm(2),
                               tcpip(3)
                              }

    GsmpVersion ::= TEXTUAL-CONVENTION
        STATUS        current
        DESCRIPTION
            "The version numbers defined for the GSMP protocol."
        SYNTAX        INTEGER {
                               noneOfTheBelow(0),
                               version1dot1(1),
                               version2dot0(2),
                               version3(3)
                              }

    --************************************************************
    -- GSMP Entity Objects
    --************************************************************

    --
    -- Switch Controller Entity table
    --

    gsmpControllerTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF GsmpControllerEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "This table represents the Switch Controller
            Entity that needs to be configured before a GSMP
            session might be started."
        ::= { gsmpObjects 1 }

    gsmpControllerEntry OBJECT-TYPE
        SYNTAX        GsmpControllerEntry
        MAX-ACCESS    not-accessible
        STATUS        current
```

```
        DESCRIPTION
            "An entry in the table showing
            the data for a specific Switch Controller
            Entity. If partitions are used, one entity
            corresponds to one specific switch partition.
            The entry should be persistently stored to
            survive a restart of the entity. "
        INDEX  { gsmpControllerEntityId }
        ::= { gsmpControllerTable 1 }

    GsmpControllerEntry ::= SEQUENCE {
        gsmpControllerEntityId                GsmpNameType,
        gsmpControllerEncapType               GsmpEncapType,
        gsmpControllerMaxVersion              GsmpVersion,
        gsmpControllerTimer                   Unsigned32,
        gsmpControllerPort                    Unsigned32,
        gsmpControllerInstance                Unsigned32,
        gsmpControllerPartitionType           GsmpPartitionType,
        gsmpControllerPartitionId             GsmpPartitionIdType,
        gsmpControllerDoResync                TruthValue,
        gsmpControllerNotificationMap         BITS,
        gsmpControllerSessionState            INTEGER,
        gsmpControllerRowStatus               RowStatus
        }

    gsmpControllerEntityId OBJECT-TYPE
        SYNTAX        GsmpNameType
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The Switch Controller Entity Id is unique
            within the operational context of the device. "
        ::= {  gsmpControllerEntry 1 }

   gsmpControllerEncapType OBJECT-TYPE
       SYNTAX        GsmpEncapType
       MAX-ACCESS    read-create
       STATUS        current
       DESCRIPTION
           "The encapsulation used for this Switch Controller.
           If atm, a corresponding row in the gsmpAtmEncapTable
           has to be defined.
           If tcpip, a corresponding row in the gsmpTcpIpEncapTable
           has to be defined."
       ::= { gsmpControllerEntry 2 }

   gsmpControllerMaxVersion OBJECT-TYPE
       SYNTAX        GsmpVersion
       MAX-ACCESS    read-create
```

```
        STATUS        current
        DESCRIPTION
            "The max version number of the GSMP protocol being used
            in this session. The version is negotiated by the
            adjacency protocol."
        DEFVAL { version3 }
        ::= { gsmpControllerEntry 3 }

    gsmpControllerTimer OBJECT-TYPE
        SYNTAX        Unsigned32(1..255)
        UNITS         "100ms"
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The timer specifies the nominal time between
            periodic adjacency protocol messages. It is a constant
            for the duration of a GSMP session. The timer is
            specified in units of 100ms."
        ::= { gsmpControllerEntry 4 }

    gsmpControllerPort  OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The local port number for the Switch Controller
            Entity."
        ::= { gsmpControllerEntry 5 }

    gsmpControllerInstance OBJECT-TYPE
        SYNTAX        Unsigned32(1..16777215)
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The instance number for the Switch Controller
            Entity."
        ::= { gsmpControllerEntry 6 }

    gsmpControllerPartitionType OBJECT-TYPE
        SYNTAX        GsmpPartitionType
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
           "A controller can assign the specific partition identifier
           to the session by setting the Partition Type to
           fixedPartitionAssigned(3). A controller can let the switch
           assign the partition identifier by setting the Partition Type
           to fixedPartitionRequest(2). A controller can specify that
           no partitions are handled in the session  by setting the
```

```
           Partition Type to noPartition(1)."
        ::= { gsmpControllerEntry 7 }

    gsmpControllerPartitionId OBJECT-TYPE
        SYNTAX        GsmpPartitionIdType
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The Id for the specific switch partition that this
            Switch Controller is concerned with.
            If partitions are not used, i.e Partition Type =
            noPartition(1), or if the controller lets the
            switch assigns Partition ID, i.e Partition Type =
            fixedPartitionRequest(2), then this object should
            be set to zero."
        ::= { gsmpControllerEntry 8 }

    gsmpControllerDoResync OBJECT-TYPE
        SYNTAX        TruthValue
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "This object specifies whether the controller should
            resynchronise or reset in case of loss of synchronisation.
            If this object is set to true then the Controller should
            resync with PFLAG=2 (recovered adjacency)."
        DEFVAL { true }
        ::= { gsmpControllerEntry 9 }

    gsmpControllerNotificationMap OBJECT-TYPE
        SYNTAX        BITS {
                                sessionDown(0),
                                sessionUp(1),
                                sendFailureIndication(2),
                                receivedFailureIndication(3),
                                portUpEvent(4),
                                portDownEvent(5),
                                invalidLabelEvent(6),
                                newPortEvent(7),
                                deadPortEvent(8),
                                adjacencyUpdateEvent(9)
                             }
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "This bitmap defines whether a corresponding SNMP
            notification should be sent if a GSMP event is received
            by the Switch Controller. If the bit is set to 1 a
            notification should be sent."
```

```
        DEFVAL {{ sessionDown, sessionUp,
               sendFailureIndication, receivedFailureIndication }}
        ::= { gsmpControllerEntry 10 }

    gsmpControllerSessionState OBJECT-TYPE
        SYNTAX        INTEGER {
                                null(1),
                                synsent(2),
                                synrcvd(3),
                                estab(4)
                               }
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The state for the existing or potential session that
            this entity is concerned with.
            The NULL state is returned if the proper encapsulation
            data is not yet configured, if the row is not in active
            status or if the session is in NULL state as defined in
            the GSMP specification."
        ::= { gsmpControllerEntry 11}

    gsmpControllerRowStatus OBJECT-TYPE
         SYNTAX      RowStatus
         MAX-ACCESS  read-create
         STATUS      current
         DESCRIPTION
             "An object that allows entries in this table to
             be created and deleted using the
             RowStatus convention."
        ::= { gsmpControllerEntry 12 }

     --
     -- Switch Entity table
     --

     gsmpSwitchTable OBJECT-TYPE
         SYNTAX        SEQUENCE OF GsmpSwitchEntry
         MAX-ACCESS    not-accessible
         STATUS        current
         DESCRIPTION
             "This table represents the Switch
             Entity that needs to be configured before a gsmp
             session might be started."
         ::= { gsmpObjects 2 }

     gsmpSwitchEntry OBJECT-TYPE
         SYNTAX        GsmpSwitchEntry
         MAX-ACCESS    not-accessible
```

```
        STATUS       current
        DESCRIPTION
            "An entry in the table showing
            the data for a specific Switch
            Entity. If partitions are used, one entity
            corresponds to one specific switch partition.
            The entry should be persistently stored to
            survive a restart of the entity. "
        INDEX  { gsmpSwitchEntityId }
        ::= { gsmpSwitchTable 1 }

    GsmpSwitchEntry ::= SEQUENCE {
        gsmpSwitchEntityId             GsmpNameType,
        gsmpSwitchEncapType            GsmpEncapType,
        gsmpSwitchMaxVersion           GsmpVersion,
        gsmpSwitchTimer                Unsigned32,
        gsmpSwitchName                 GsmpNameType,
        gsmpSwitchPort                 Unsigned32,
        gsmpSwitchInstance             Unsigned32,
        gsmpSwitchPartitionType        GsmpPartitionType,
        gsmpSwitchPartitionId          GsmpPartitionIdType,
        gsmpSwitchNotificationMap      BITS,
        gsmpSwitchSwitchType           OCTET STRING,
        gsmpSwitchWindowSize           Unsigned32,
        gsmpSwitchSessionState         INTEGER,
        gsmpSwitchRowStatus            RowStatus
        }

    gsmpSwitchEntityId OBJECT-TYPE
        SYNTAX       GsmpNameType
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "The Switch Entity Id is unique
            within the operational context of the device. "
        ::= {  gsmpSwitchEntry 1 }

   gsmpSwitchEncapType OBJECT-TYPE
       SYNTAX       GsmpEncapType
       MAX-ACCESS   read-create
       STATUS       current
       DESCRIPTION
           "The encapsulation used to for this Switch Entity.
           If atm, a corresponding row in the gsmpAtmEncapTable
           has to be defined.
           If tcpip, a corresponing row in the gsmpTcpIpEncapTable
           has to be defined."
       ::= { gsmpSwitchEntry 2 }
```

```
    gsmpSwitchMaxVersion OBJECT-TYPE
        SYNTAX        GsmpVersion
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The max version number of the GSMP protocol being
            supported by this Switch. The version is negotiated by
            the adjacency protocol."
        DEFVAL { version3 }
        ::= { gsmpSwitchEntry 3 }

    gsmpSwitchTimer OBJECT-TYPE
        SYNTAX        Unsigned32(1..255)
        UNITS         "100ms"
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The timer specifies the nominal time between
            periodic adjacency protocol messages. It is a constant
            for the duration of a GSMP session. The timer is
            specified in units of 100ms."
        ::= { gsmpSwitchEntry 4 }

    gsmpSwitchName OBJECT-TYPE
        SYNTAX        GsmpNameType
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The name of the Switch. The first three octets must be an
            Organisationally Unique Identifier (OUI) that identifies
            the manufacturer of the Switch. This is by default set to
            the same value as the gsmpSwitchId object if not
            separately specified. "
        ::= {gsmpSwitchEntry 5}

    gsmpSwitchPort  OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The local port number for this Switch Entity."
        ::= { gsmpSwitchEntry 6 }

    gsmpSwitchInstance OBJECT-TYPE
        SYNTAX        Unsigned32(1..16777215)
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The instance number for the Switch Entity."
```

```
        ::= { gsmpSwitchEntry 7 }

    gsmpSwitchPartitionType OBJECT-TYPE
        SYNTAX        GsmpPartitionType
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "A switch can assign the specific partition identifier to
            the session by setting the Partition Type to
            fixedPartitionAssigned(3). A switch can let the controller
            assign the partition identifier by setting the Partition
            Type to fixedPartitionRequest(2). A switch can specify
            that no partitions are handled in the session  by setting
            the Partition Type to noPartition(1)."
        ::= { gsmpSwitchEntry 8 }

    gsmpSwitchPartitionId OBJECT-TYPE
        SYNTAX        GsmpPartitionIdType
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The Id for this specific switch partition that the switch
            entity represents. If partitions are not used, i.e.
            Partition Type = noPartition(1), or if the switch lets the
            controller assigns Partition ID, i.e. Partition Type =
            fixedPartitionRequest(2), then this object should
            be set to zero."
        ::= { gsmpSwitchEntry 9 }

    gsmpSwitchNotificationMap OBJECT-TYPE
        SYNTAX        BITS {
                                sessionDown(0),
                                sessionUp(1),
                                sendFailureIndication(2),
                                receivedFailureIndication(3),
                                portUpEvent(4),
                                portDownEvent(5),
                                invalidLabelEvent(6),
                                newPortEvent(7),
                                deadPortEvent(8),
                                adjacencyUpdateEvent(9)
                             }
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "This bitmap defines whether a corresponding SNMP
            notification should be sent if an GSMP event is sent
            by the Switch Entity. If the bit is set to 1 a
            notification should be sent."
```

```
        DEFVAL {{ sessionDown, sessionUp,
               sendFailureIndication, receivedFailureIndication }}
        ::= { gsmpSwitchEntry 10 }

    gsmpSwitchSwitchType OBJECT-TYPE
        SYNTAX        OCTET STRING (SIZE(2))
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "A 16-bit field allocated by the manufacturer
            of the switch. The Switch Type
            identifies the product. When the Switch Type is combined
            with the OUI from the Switch Name the product is
            uniquely identified. "
        ::= { gsmpSwitchEntry 11 }

    gsmpSwitchWindowSize OBJECT-TYPE
        SYNTAX        Unsigned32(1..65535)
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "The maximum number of unacknowledged request messages
            that may be transmitted by the controller without the
            possibility of loss. This field is used to prevent
            request messages from being lost in the switch because of
            overflow in the receive buffer. The field is a hint to
            the controller."
        ::= { gsmpSwitchEntry 12 }

    gsmpSwitchSessionState OBJECT-TYPE
        SYNTAX        INTEGER {
                                null(1),
                                synsent(2),
                                synrcvd(3),
                                estab(4)
                              }
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The state for the existing or potential session that
            this entity is concerned with.
            The NULL state is returned if the proper encapsulation
            data is not yet configured, if the row is not in active
            status or if the session is in NULL state as defined in
            the GSMP specification."
        ::= { gsmpSwitchEntry 13}

    gsmpSwitchRowStatus OBJECT-TYPE
         SYNTAX      RowStatus
```

```
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "An object that allows entries in this table to
            be created and deleted using the
            RowStatus convention."
       ::= { gsmpSwitchEntry 14 }

    --*****************************************************************
    -- GSMP Encapsulation Objects
    --*****************************************************************

    --
    -- GSMP ATM Encapsulation Table
    --

    gsmpAtmEncapTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF GsmpAtmEncapEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "This table contains the atm encapsulation data
            for the Controller or Switch that uses atm as
            encapsulation.
            The entry should be persistently stored to
            survive a restart of the entity. "
        ::= { gsmpObjects 3 }

    gsmpAtmEncapEntry OBJECT-TYPE
        SYNTAX        GsmpAtmEncapEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the table showing
            the encapsulation data for a
            specific Switch Controller or Switch."
        INDEX { gsmpAtmEncapEntityId }
        ::= { gsmpAtmEncapTable 1 }

    GsmpAtmEncapEntry ::= SEQUENCE {
        gsmpAtmEncapEntityId          GsmpNameType,
        gsmpAtmEncapIfIndex           InterfaceIndex,
        gsmpAtmEncapVpi               AtmVpIdentifier,
        gsmpAtmEncapVci               AtmVcIdentifier,
        gsmpAtmEncapRowStatus         RowStatus
        }

    gsmpAtmEncapEntityId OBJECT-TYPE
        SYNTAX        GsmpNameType
```

```
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The Controller Id or Switch Id that is unique
            within the operational context of the device. "
        ::= {  gsmpAtmEncapEntry 1 }

    gsmpAtmEncapIfIndex OBJECT-TYPE
        SYNTAX      InterfaceIndex
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "The interface index for the virtual channel over which
            the GSMP session is established, i.e., the GSMP control
            channel for LLC/SNAP encapsulated GSMP messages on an
            ATM data link layer."
        ::= { gsmpAtmEncapEntry 2 }

    gsmpAtmEncapVpi OBJECT-TYPE
        SYNTAX      AtmVpIdentifier
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            " The VPI value for the virtual channel over which the
            GSMP session is established, i.e., the GSMP control
            channel for LLC/SNAP encapsulated GSMP messages on an
            ATM data link layer."
        DEFVAL  { 0 }
        ::= { gsmpAtmEncapEntry 3 }

    gsmpAtmEncapVci OBJECT-TYPE
        SYNTAX      AtmVcIdentifier
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            " The VCI value for the virtual channel over which the
            GSMP session is established, i.e., the GSMP control
            channel for LLC/SNAP encapsulated GSMP messages on an
            ATM data link layer."
        DEFVAL  { 15 }
        ::= { gsmpAtmEncapEntry 4 }

   gsmpAtmEncapRowStatus OBJECT-TYPE
        SYNTAX      RowStatus
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "An object that allows entries in this table to
            be created and deleted using the
```

```
            RowStatus convention."
        ::= { gsmpAtmEncapEntry 5 }

    --
    -- GSMP TCP/IP Encapsulation Table
    --

    gsmpTcpIpEncapTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF GsmpTcpIpEncapEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "This table contains the encapsulation data
            for the Controller or Switch that uses TCP/IP as
            encapsulation. The entry should be persistently
            stored to survive a restart of the entity. "
        ::= { gsmpObjects 4 }

    gsmpTcpIpEncapEntry OBJECT-TYPE
        SYNTAX        GsmpTcpIpEncapEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the table showing
            the encapsulation data for a
            specific Controller or Switch."
        INDEX { gsmpTcpIpEncapEntityId }
        ::= { gsmpTcpIpEncapTable 1 }

    GsmpTcpIpEncapEntry ::= SEQUENCE {
        gsmpTcpIpEncapEntityId         GsmpNameType,
        gsmpTcpIpEncapAddressType      InetAddressType,
        gsmpTcpIpEncapAddress          InetAddress,
        gsmpTcpIpEncapPortNumber       Unsigned32,
        gsmpTcpIpEncapRowStatus        RowStatus
        }

    gsmpTcpIpEncapEntityId OBJECT-TYPE
        SYNTAX        GsmpNameType
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The Controller or Switch Id is unique
            within the operational context of the device. "
        ::= {  gsmpTcpIpEncapEntry 1 }

    gsmpTcpIpEncapAddressType OBJECT-TYPE
        SYNTAX      InetAddressType
        MAX-ACCESS  read-create
```

```
        STATUS      current
        DESCRIPTION
            "The type of address in gsmpTcpIpEncapAddress."
        ::= { gsmpTcpIpEncapEntry 2 }

    gsmpTcpIpEncapAddress OBJECT-TYPE
        SYNTAX      InetAddress
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "The IPv4 or IPv6 address used for
            the GSMP session peer."
        ::= { gsmpTcpIpEncapEntry 3 }

    gsmpTcpIpEncapPortNumber OBJECT-TYPE
        SYNTAX      Unsigned32(0..65535)
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "The TCP port number used for the TCP session
            establishment to the GSMP peer."
        DEFVAL { 6068 }
        ::= { gsmpTcpIpEncapEntry 4 }

   gsmpTcpIpEncapRowStatus OBJECT-TYPE
        SYNTAX      RowStatus
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "An object that allows entries in this table to
            be created and deleted using the
            RowStatus convention."
       ::= { gsmpTcpIpEncapEntry 5 }

    --*****************************************************************
    -- GSMP Session Objects
    --*****************************************************************

    --
    -- GSMP Session table
    --

    gsmpSessionTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF GsmpSessionEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "This table represents the sessions between
            Controller and Switch pairs. "
```

```
        ::= { gsmpObjects 5 }

    gsmpSessionEntry OBJECT-TYPE
        SYNTAX        GsmpSessionEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the table showing
            the session data for a specific Controller and
            Switch pair. Also, statistics for this specific
            session is shown."
        INDEX  { gsmpSessionThisSideId, gsmpSessionFarSideId }
        ::= { gsmpSessionTable 1 }

    GsmpSessionEntry ::= SEQUENCE {
        gsmpSessionThisSideId                GsmpNameType,
        gsmpSessionFarSideId                 GsmpNameType,
        gsmpSessionVersion                   GsmpVersion,
        gsmpSessionTimer                     Integer32,
        gsmpSessionPartitionId               GsmpPartitionIdType,
        gsmpSessionAdjacencyCount            Unsigned32,
        gsmpSessionFarSideName               GsmpNameType,
        gsmpSessionFarSidePort               Unsigned32,
        gsmpSessionFarSideInstance           Unsigned32,
        gsmpSessionLastFailureCode           Unsigned32,
        gsmpSessionDiscontinuityTime         TimeStamp,
        gsmpSessionStatUptime                Counter32,
        gsmpSessionStatSentMessages          Counter32,
        gsmpSessionStatFailureIndication     Counter32,
        gsmpSessionStatReceivedMessages      Counter32,
        gsmpSessionStatReceivedFailure       Counter32,
        gsmpSessionStatPortUpEvents          Counter32,
        gsmpSessionStatPortDownEvents        Counter32,
        gsmpSessionStatInvLabelEvents        Counter32,
        gsmpSessionStatNewPortEvents         Counter32,
        gsmpSessionStatDeadPortEvents        Counter32,
        gsmpSessionStatAdjUpdateEvents       Counter32
        }

    gsmpSessionThisSideId OBJECT-TYPE
        SYNTAX        GsmpNameType
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "This side ID uniquely identifies the entity that this
            session relates to within the operational
            context of the device. "
        ::= {  gsmpSessionEntry 1 }
```

```
     gsmpSessionFarSideId OBJECT-TYPE
         SYNTAX        GsmpNameType
         MAX-ACCESS    not-accessible
         STATUS        current
         DESCRIPTION
             "The Far side ID uniquely identifies the entity that this
             session is established against.  "
         ::= {  gsmpSessionEntry 2 }

    gsmpSessionVersion OBJECT-TYPE
        SYNTAX        GsmpVersion
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The version number of the GSMP protocol being used in
            this session. The version is the result of the
            negotiation by the adjacency protocol."
        ::= { gsmpSessionEntry 3 }

    gsmpSessionTimer OBJECT-TYPE
        SYNTAX        Integer32
        UNITS         "100ms"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The timer specifies the time remaining until the
            adjacency timer expires. The object could take negative
            values since if no valid GSMP messages are
            received in any period of time in excess of three times
            the value of the Timer negotiated by the adjacency
            protocol loss of synchronisation may be declared. The
            timer is specified in units of 100ms."
        ::= { gsmpSessionEntry 4 }

    gsmpSessionPartitionId OBJECT-TYPE
        SYNTAX        GsmpPartitionIdType
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The Partition Id for the specific switch partition that
            this session is concerned with."
        ::= { gsmpSessionEntry 5 }

    gsmpSessionAdjacencyCount OBJECT-TYPE
        SYNTAX        Unsigned32(1..255)
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "This object specifies the current number of adjacencies
```

```
            that are established with controllers and the switch
            partition that is used for this session. The value
            includes this session."
        ::= { gsmpSessionEntry 6 }

    gsmpSessionFarSideName OBJECT-TYPE
        SYNTAX            GsmpNameType
        MAX-ACCESS        read-only
        STATUS            current
        DESCRIPTION
            "The name of the far side as advertised in the adjacency
            message."
        ::= {gsmpSessionEntry 7}

    gsmpSessionFarSidePort  OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The local port number of the link across which the
            message is being sent."
        ::= { gsmpSessionEntry 8 }

    gsmpSessionFarSideInstance OBJECT-TYPE
        SYNTAX        Unsigned32(1..16777215)
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The instance number used for the link during this
            session. Zero is not a valid instance number."
        ::= { gsmpSessionEntry 9 }

    gsmpSessionLastFailureCode OBJECT-TYPE
        SYNTAX        Unsigned32(0..255)
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "This is the last failure code that was received over
            this session. If no failure code have been received, the
            value is zero."
        ::= { gsmpSessionEntry 10 }

    gsmpSessionDiscontinuityTime OBJECT-TYPE
        SYNTAX        TimeStamp
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The value of sysUpTime on the most recent occasion at
            which one or more of this session's counters
```

```
            suffered a discontinuity. If no such discontinuities have
            occurred since then, this object contains a zero value.
            Also, an NMS can distinguish when a session
            between a given Entity and the far side goes away and
            then is 're-established'.  This value would change and
            thus indicate to the NMS that this is a
            different session."
         ::= { gsmpSessionEntry 11 }

    gsmpSessionStatUptime  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The time in seconds that the session have been in
            established state."
        ::= { gsmpSessionEntry 12 }

    gsmpSessionStatSentMessages  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of messages that have been sent in this
            session."
        ::= { gsmpSessionEntry 13 }

    gsmpSessionStatFailureIndication  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of messages that have been sent with a
            failure indication in this session."
        ::= { gsmpSessionEntry 14 }

    gsmpSessionStatReceivedMessages  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of messages that have been received in
            this session."
        ::= { gsmpSessionEntry 15 }

    gsmpSessionStatReceivedFailure  OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
```

```
        DESCRIPTION
            "The number of messages that have been received in
            this session with a failure indication."
        ::= { gsmpSessionEntry 16 }

    gsmpSessionStatPortUpEvents OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of Port Up events that have been sent or
            received on this session."
        ::= { gsmpSessionEntry 17 }

    gsmpSessionStatPortDownEvents OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of Port Down events that have been sent or
            received on this session."
        ::= { gsmpSessionEntry 18 }

    gsmpSessionStatInvLabelEvents OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of Invalid label events that have been sent
            or received on this session."
        ::= { gsmpSessionEntry 19 }

    gsmpSessionStatNewPortEvents OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of New Port events that have been sent or
            received on this session."
        ::= { gsmpSessionEntry 20 }

    gsmpSessionStatDeadPortEvents OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of Dead Port events that have been sent or
            received on this session."
        ::= { gsmpSessionEntry 21 }
```

```
    gsmpSessionStatAdjUpdateEvents OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The number of Adjacency Update events that have been sent
            or received on this session."
        ::= { gsmpSessionEntry 22 }


    -- ************************************************************
    -- GSMP Notifications
    -- ************************************************************

     gsmpNotificationsPrefix
       OBJECT IDENTIFIER ::= { gsmpNotifications 0 }
     gsmpNotificationsObjects
       OBJECT IDENTIFIER ::= { gsmpNotifications 1 }

    --
    -- Notification objects
    --

    gsmpEventPort OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    accessible-for-notify
        STATUS        current
        DESCRIPTION
            "This object specifies the Port Number that is
            carried in this event."
        ::= { gsmpNotificationsObjects 1 }

    gsmpEventPortSessionNumber OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    accessible-for-notify
        STATUS        current
        DESCRIPTION
            "This object specifies the Port Session Number that is
            carried in this event."
        ::= { gsmpNotificationsObjects 2 }

    gsmpEventSequenceNumber OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    accessible-for-notify
        STATUS        current
        DESCRIPTION
            "This object specifies the Event Sequence Number that is
```

```
            carried in this event."
        ::= { gsmpNotificationsObjects 3 }

    gsmpEventLabel OBJECT-TYPE
        SYNTAX        Unsigned32
        MAX-ACCESS    accessible-for-notify
        STATUS        current
        DESCRIPTION
            "This object specifies the Label that is
            carried in this event."
        ::= { gsmpNotificationsObjects 4 }

    gsmpThisSideId OBJECT-TYPE
        SYNTAX        GsmpNameType
        MAX-ACCESS    accessible-for-notify
        STATUS        current
        DESCRIPTION
            "This side ID uniquely identifies the entity that this
            session event relates to. "
        ::= { gsmpNotificationsObjects 5 }

    gsmpFarSideId OBJECT-TYPE
        SYNTAX        GsmpNameType
        MAX-ACCESS    accessible-for-notify
        STATUS        current
        DESCRIPTION
            "Far side ID uniquely identifies the other entity that
            this session event relates to. "
        ::= { gsmpNotificationsObjects 6 }

    --
    -- Notifications
    --

     gsmpSessionDownTrap NOTIFICATION-TYPE
         OBJECTS  {
                gsmpThisSideId,
                gsmpFarSideId,
                gsmpSessionStatUptime,
                gsmpSessionStatSentMessages,
                gsmpSessionStatFailureIndication,
                gsmpSessionStatReceivedMessages,
                gsmpSessionStatReceivedFailure,
                gsmpSessionStatPortUpEvents,
                gsmpSessionStatPortDownEvents,
                gsmpSessionStatInvLabelEvents,
                gsmpSessionStatNewPortEvents,
                gsmpSessionStatDeadPortEvents,
                gsmpSessionStatAdjUpdateEvents
```

```
            }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated whenever a session is taken down, regardless
            of whether the session went down normally or not.
            Its purpose is to allow a management application
            (primarily an accounting application) that is
            monitoring the session statistics to receive the final
            values of these counters, so that the application can
            properly account for the amounts the counters were
            incremented since the last time the application polled
            them. The gsmpSessionStatUptime object provides the
            total amount of time that the session was active.

            This notification is not a substitute for polling the
            session statistic counts. In particular, the count
            values reported in this notification cannot be assumed
            to be the complete totals for the life of the session,
            since they may have wrapped while the
            session was up.

            The session to which the objects in this notification
            apply is identified by the session gsmpThisSideId,
            gsmpFarSideId objects.
            An instance of this notification will contain exactly
            one instance of each of its objects, and these objects
            will all belong to the same conceptual row of the
            gsmpSessionTable."
    ::= { gsmpNotificationsPrefix 1 }

    gsmpSessionUpTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId
               }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when new session is established.

            The new session is identified by the
            gsmpThisSideId, gsmpFarSideId objects."
    ::= { gsmpNotificationsPrefix 2 }

    gsmpSentFailureIndTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId,
```

```
                gsmpSessionLastFailureCode,
                gsmpSessionStatFailureIndication
                }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when a message with a failure indication was
            sent.

            The notification indicates a change in the value of
            gsmpSessionStatFailureIndication. The
            gsmpSessionLastFailureCode contains the failure
            reason."
    ::= { gsmpNotificationsPrefix 3 }

    gsmpReceivedFailureIndTrap NOTIFICATION-TYPE
        OBJECTS  {
                gsmpThisSideId,
                gsmpFarSideId,
                gsmpSessionLastFailureCode,
                gsmpSessionStatReceivedFailure
                }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generate when a message with a failure indication
            is received.

            The notification indicates a change in the value of
            gsmpSessionStatReceivedFailure. The
            gsmpSessionLastFailureCode contains the failure
            reason."
    ::= { gsmpNotificationsPrefix 4 }

    gsmpPortUpEventTrap NOTIFICATION-TYPE
        OBJECTS  {
                gsmpThisSideId,
                gsmpFarSideId,
                gsmpSessionStatPortUpEvents,
                gsmpEventPort,
                gsmpEventPortSessionNumber,
                gsmpEventSequenceNumber
                }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when a Port Up Event occurs.

            The notification indicates a change in the value of
```

```
            gsmpSessionStatPortUpEvents."
    ::= { gsmpNotificationsPrefix 5 }

    gsmpPortDownEventTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId,
               gsmpSessionStatPortDownEvents,
               gsmpEventPort,
               gsmpEventPortSessionNumber,
               gsmpEventSequenceNumber
               }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when a Port Down Event occurs.

            The notification indicates a change in the value of
            gsmpSessionStatPortDownEvents."
    ::= { gsmpNotificationsPrefix 6 }

    gsmpInvalidLabelEventTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId,
               gsmpSessionStatInvLabelEvents,
               gsmpEventPort,
               gsmpEventLabel,
               gsmpEventSequenceNumber
               }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when an Invalid Label Event occurs.

            The notification indicates a change in the value of
            gsmpSessionStatInvLabelEvents."
    ::= { gsmpNotificationsPrefix 7 }

    gsmpNewPortEventTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId,
               gsmpSessionStatNewPortEvents,
               gsmpEventPort,
               gsmpEventPortSessionNumber,
               gsmpEventSequenceNumber
              }
        STATUS current
```

```
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when a New Port Event occurs.

            The notification indicates a change in the value of
            gsmpSessionStatNewPortEvents."
    ::= { gsmpNotificationsPrefix 8 }

    gsmpDeadPortEventTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId,
               gsmpSessionStatDeadPortEvents,
               gsmpEventPort,
               gsmpEventPortSessionNumber,
               gsmpEventSequenceNumber
               }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when a Dead Port Event occurs.

            The notification indicates a change in the value of
            gsmpSessionStatDeadPortEvents."
    ::= { gsmpNotificationsPrefix 9 }

    gsmpAdjacencyUpdateEventTrap NOTIFICATION-TYPE
        OBJECTS  {
               gsmpThisSideId,
               gsmpFarSideId,
               gsmpSessionAdjacencyCount,
               gsmpSessionStatAdjUpdateEvents,
               gsmpEventSequenceNumber
               }
        STATUS current
        DESCRIPTION
            "When it has been enabled, this notification is
            generated when an Adjacency Update Event occurs.

            The gsmpSessionAdjacencyCount contains the new value of
            the number of adjacencies
            that are established with controllers and the switch
            partition that is used for this session.

            The notification indicates a change in the value of
            gsmpSessionStatAdjUpdateEvents."
    ::= { gsmpNotificationsPrefix 10 }
```

```
     --*************************************************************
     -- GSMP Compliance
     --*************************************************************

     gsmpGroups         OBJECT IDENTIFIER ::= { gsmpConformance 1 }
     gsmpCompliances    OBJECT IDENTIFIER ::= { gsmpConformance 2 }

     gsmpModuleCompliance MODULE-COMPLIANCE
         STATUS current
         DESCRIPTION
             "The compliance statement for agents that support
             the GSMP MIB."
         MODULE -- this module
         MANDATORY-GROUPS { gsmpGeneralGroup
                          }
         GROUP gsmpControllerGroup
         DESCRIPTION
             "This group is mandatory for all Switch
             Controllers"

         GROUP gsmpSwitchGroup
         DESCRIPTION
             "This group is mandatory for all Switches"

         GROUP gsmpAtmEncapGroup
         DESCRIPTION
             "This group must be supported if ATM is used for GSMP
             encapsulation. "

         GROUP gsmpTcpIpEncapGroup
         DESCRIPTION
             "This group must be supported if TCP/IP is used for GSMP
             encapsulation. "

         OBJECT gsmpTcpIpEncapAddressType
         DESCRIPTION
            "An implementation is only required to support
             'unknown(0)', and IPv4 addresses. Supporting IPv6 addresses
             is optional. Defining Internet addresses by using DNS
             domain names are not allowed."

         OBJECT gsmpTcpIpEncapAddress
         DESCRIPTION
            "An implementation is only required to support
            IPv4 addresses. Supporting IPv6 addresses
            is optional. Prefix sizes could range from 0..20."

         GROUP gsmpNotificationObjectsGroup
         DESCRIPTION
```

```
            "This group must be supported if notifications
            are supported. "

        GROUP gsmpNotificationsGroup
        DESCRIPTION
            "This group must be supported if notifications
            are supported. "

        ::= { gsmpCompliances 1 }

    -- units of conformance

    gsmpGeneralGroup OBJECT-GROUP
        OBJECTS {
        gsmpSessionVersion,
        gsmpSessionTimer,
        gsmpSessionPartitionId,
        gsmpSessionAdjacencyCount,
        gsmpSessionFarSideName,
        gsmpSessionFarSidePort,
        gsmpSessionFarSideInstance,
        gsmpSessionLastFailureCode,
        gsmpSessionDiscontinuityTime,
        gsmpSessionStatUptime,
        gsmpSessionStatSentMessages,
        gsmpSessionStatFailureIndication,
        gsmpSessionStatReceivedMessages,
        gsmpSessionStatReceivedFailure,
        gsmpSessionStatPortUpEvents,
        gsmpSessionStatPortDownEvents,
        gsmpSessionStatInvLabelEvents,
        gsmpSessionStatNewPortEvents,
        gsmpSessionStatDeadPortEvents,
        gsmpSessionStatAdjUpdateEvents
        }
        STATUS    current
        DESCRIPTION
            "Objects that apply to all GSMP implementations."
        ::= { gsmpGroups 1 }

    gsmpControllerGroup OBJECT-GROUP
        OBJECTS {
        gsmpControllerEncapType,
        gsmpControllerMaxVersion,
        gsmpControllerTimer,
        gsmpControllerPort,
        gsmpControllerInstance,
        gsmpControllerPartitionType,
        gsmpControllerPartitionId,
```

```
        gsmpControllerDoResync,
        gsmpControllerNotificationMap,
        gsmpControllerSessionState,
        gsmpControllerRowStatus
        }
      STATUS    current
      DESCRIPTION
          "Objects that apply GSMP implementations of
          Switch Controllers."
      ::= { gsmpGroups 2 }

    gsmpSwitchGroup OBJECT-GROUP
        OBJECTS {
        gsmpSwitchEncapType,
        gsmpSwitchMaxVersion,
        gsmpSwitchTimer,
        gsmpSwitchName,
        gsmpSwitchPort,
        gsmpSwitchInstance,
        gsmpSwitchPartitionType,
        gsmpSwitchPartitionId,
        gsmpSwitchNotificationMap,
        gsmpSwitchSwitchType,
        gsmpSwitchWindowSize,
        gsmpSwitchSessionState,
        gsmpSwitchRowStatus
        }
      STATUS    current
      DESCRIPTION
          "Objects that apply GSMP implementations of
          Switches."
      ::= { gsmpGroups 3 }

    gsmpAtmEncapGroup OBJECT-GROUP
        OBJECTS {
        gsmpAtmEncapIfIndex,
        gsmpAtmEncapVpi,
        gsmpAtmEncapVci,
        gsmpAtmEncapRowStatus
        }
      STATUS    current
      DESCRIPTION
          "Objects that apply to GSMP implementations that
          supports ATM for GSMP encapsulation."
      ::= { gsmpGroups 4 }

    gsmpTcpIpEncapGroup OBJECT-GROUP
        OBJECTS {
        gsmpTcpIpEncapAddressType,
```

```
         gsmpTcpIpEncapAddress,
         gsmpTcpIpEncapPortNumber,
         gsmpTcpIpEncapRowStatus
         }
        STATUS    current
        DESCRIPTION
            "Objects that apply to GSMP implementations that
            supports TCP/IP for GSMP encapsulation."
        ::= { gsmpGroups 5 }

      gsmpNotificationObjectsGroup OBJECT-GROUP
         OBJECTS {
         gsmpEventPort,
         gsmpEventPortSessionNumber,
         gsmpEventSequenceNumber,
         gsmpEventLabel,
         gsmpThisSideId,
         gsmpFarSideId}
        STATUS    current
        DESCRIPTION
            "Objects that are contained in the notifications."
        ::= { gsmpGroups 6 }

     gsmpNotificationsGroup  NOTIFICATION-GROUP
         NOTIFICATIONS {
         gsmpSessionDownTrap,
         gsmpSessionUpTrap,
         gsmpSentFailureIndTrap,
         gsmpReceivedFailureIndTrap,
         gsmpPortUpEventTrap,
         gsmpPortDownEventTrap,
         gsmpInvalidLabelEventTrap,
         gsmpNewPortEventTrap,
         gsmpDeadPortEventTrap,
         gsmpAdjacencyUpdateEventTrap
         }
        STATUS  current
        DESCRIPTION
            "The notifications which indicate specific changes
            in the value of objects gsmpSessionTable."
        ::= { gsmpGroups 7 }


END
```

5. Revision History

This section should be removed when this document is published as an RFC.

5.1 Changes from < draft-ietf-gsmp-mib-00.txt >

Mib totally remade :-)

5.2 Changes from < draft-ietf-gsmp-mib-01.txt >

Besides from editorial changes the following updates was made;
- Imported AtmVcIdentifier, AtmVpIdentifier FROM ATM-TC-MIB
- Removed serviceModelType
- Separated the Vse and Vsce config stuf in separate tables.
- Also added ATM,TCP/IP, Vse and Vsce groups
- Added control of multiple controllers
- Added Vse window size and switch type configuration.
- Added control of resync strategy
- Added last failure code and discontinuity time
- Added event config and count
- Added notifications

5.3 Changes from < draft-ietf-gsmp-mib-02.txt >

Besides from editorial changes the following updates was made;
- Added gsmpThisSideId and gsmpFarSideId helper objects.
- Replaced Ipv4 address type with TC for Internet Network Addresses
- Added textual conventions for reader convenience.
- Removed gsmpVsceName object and added default behaviour of gsmpVseName
¡ Added row status objects for the encap tables.
¡ Added DEFVAL and ranges to objects.
¡ Persistent storage clarified
¡ "Virtual" removed from names and concepts. gsmpVsceTable now gsmpControllerTable and gsmpVseTable is gsmpSwitchTable.
¡ Partition Type object added.
¡ Session state moved from Session table to Controller and Switch tables.
¡ Removed gsmpSwitchAllowMultContr object, it's redundant.
¡ BITS import removed.
¡ Partition ID object added to session table.
¡ gsmpSessionStat table merged into the gmspSessionTable.

6. Acknowledgments

The authors would like to thank Avri Doria and David Partain for valuable input and comments.

7. References

[RFC1155] Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, RFC 1155, May 1990

[RFC1212] Rose, M., and K. McCloghrie, "Concise MIB Definitions", STD 16, RFC 1212, March 1991

[RFC1215] M. Rose, "A Convention for Defining Traps for use with the SNMP", RFC 1215, March 1991

[RFC1157] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", STD 15, RFC 1157, May 1990.

[RFC1901] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", RFC 1901, January 1996.

[RFC1905] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1905, January 1996.

[RFC1906] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1906, January 1996.

[RFC1987] Newman, P, Edwards, W., Hinden, R., Hoffman, E. Ching Liaw, F., Lyon, T. and Minshall, G., "Ipsilon's General Switch Management Protocol Specification," Version 1.1, RFC 1987, August 1996.

[RFC2026] Bradner, S., "The Internet Standards Process ¡ Revision 3", BCP 9, RFC 2026, Harvard University, October 1996

[RFC2233] McCloghrie, K., F. Kastenholz, "The Interfaces Group MIB using SMIv2", RFC 2233, November 1997.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, Harvard University, March 1997

[RFC2397] Newman, P, Edwards, W., Hinden, R., Hoffman, E., Ching

Liaw, F., Lyon, T. and Minshall, G., "Ipsilon's General Switch Management Protocol Specification," Version 2.0, RFC 2397, March 1998.

[RFC2434] Narten, T., and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs.", RFC 2434, IBM, Maxware, October 1998

[RFC2514] Noto, M., E. Spiegel, K. Tesink, "Definition of Textual Conventions and OBJECT-IDENTITIES for ATM Management", RFC 2514, February 1999.

[RFC2570] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction to Version 3 of the Internet-standard Network Management Framework", RFC 2570, April 1999

[RFC2571] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", RFC 2571, April 1999

[RFC2572] Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", RFC 2572, April 1999

[RFC2573] Levi, D., Meyer, P., and B. Stewart, "SNMPv3 Applications", RFC 2573, April 1999

[RFC2574] Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", RFC 2574, April 1999

[RFC2575] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", RFC 2575, April 1999

[RFC2578] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999

[RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999

[RFC2580] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999

[RFC2851] Daniele, M., Haberman, B., Routhier, S. and J., Schoenwaelder "Textual Conventions for Internet Network

Addresses", RFC 2851, June 2000

[GSMPv3] Doria, Hellstrand, Sundell, Worster, "General Switch Management Protocol V3", work in progress, November 2000

[GSMPenc] Worster, Doria, Buerkle, "GSMP Packet Encapsulations for ATM, Ethernet and TCP", work in progress, November 2000

8. Security Considerations

Assuming that secure network management (such as SNMP v3) is implemented, the objects represented in this MIB do not pose a threat to the security of the network.

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.

There are a number of managed objects in this MIB that may contain sensitive information. These are contained in the gsmpSwitchTable and gsmpControllerTable. 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.

SNMPv2 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.

9. Authors' Addresses

Hans Sjostrand
Ericsson Telecom AB
Business Unit Data Backbone and Optical Networks
S-126 25 Stockholm, Sweden
Phone: +46 8 719 9960
Email: hans.sjostrand@ericsson.com

Joachim Buerkle
Nortel Networks Germany GmbH & Co. KG
Hahnstrasse 37-39
D-60528 Frankfurt am Main, Germany
Phone: +49 69 6697 3281
Email: joachim.buerkle@nortelnetworks.com

Balaji Srinivasan
CPlane Inc.
5150 El Camino Real
Suite B-31
Los Altos, CA 94022
Phone +1 650 938 8066 ext 103
Email: balaji@cplane.com

10. Full Copyright Statement

Copyright (C) The Internet Society (2000). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING

BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.