SS7 MTP3-User Adaptation Layer (M3UA) 
Management Information Base using SMIv2 
<draft-ietf-sigtran-m3ua-mib-07.txt> 

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Abstract

The MTP3-User Adaptation Layer is a protocol for the transport of any SS7 MTP3-User signalling (e.g., ISUP and SCCP messages) over IP using the services of the Stream Control Transmission Protocol. Also, provision is made for protocol elements that enable a seamless operation of the MTP3-User peers in the SS7 and IP domains. This protocol would be used between a Signalling Gateway (SG) and a Media Gateway Controller (MGC) or IP-resident Database. It is assumed that the SG receives SS7 signaling over a standard SS7 interface using the SS7 Message Transfer Part (MTP) to provide transport.
This memo defines the Management Information Base (MIB) module, which describes the minimum amount of objects needed to manage the implementation of the M3UA.

Open Issues

- Remove this section.
- Remove Revision History
- IANA -> Decide under which object identifier branch of the SNMP tree, M3UA will be placed (value obtained when submitted to the IETF editor).
- Update references to drafts.
- Check Security Considerations section
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1. Introduction

This memo defines the Management Information Base (MIB) module which describes managed objects for implementations of the M3UA.

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

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

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].

1.1 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>Application Server</td>
</tr>
<tr>
<td>ASP</td>
<td>Application Server Process</td>
</tr>
<tr>
<td>ASPM</td>
<td>Application Server Process Management</td>
</tr>
<tr>
<td>CIC</td>
<td>Circuit Identification Code</td>
</tr>
<tr>
<td>DPC</td>
<td>Destination Point Code</td>
</tr>
<tr>
<td>IPSP</td>
<td>IP Server Process</td>
</tr>
<tr>
<td>MIB</td>
<td>Management Information Base</td>
</tr>
<tr>
<td>M3UA</td>
<td>SS7 MTP3-User Adaptation Layer</td>
</tr>
<tr>
<td>NA</td>
<td>Network Appearance</td>
</tr>
<tr>
<td>NI</td>
<td>Network Indicator</td>
</tr>
<tr>
<td>OPC</td>
<td>Originating Point Code</td>
</tr>
<tr>
<td>PC</td>
<td>Point Code</td>
</tr>
<tr>
<td>SCTP</td>
<td>Stream Control Transmission Protocol</td>
</tr>
<tr>
<td>SG</td>
<td>Signaling Gateway</td>
</tr>
<tr>
<td>SGP</td>
<td>Signaling Gateway Process</td>
</tr>
<tr>
<td>SI</td>
<td>Service Indicator</td>
</tr>
<tr>
<td>SMI</td>
<td>Structure of Management Information</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
</tr>
<tr>
<td>SP</td>
<td>Signaling Process</td>
</tr>
<tr>
<td>SSN</td>
<td>Sub-System Number</td>
</tr>
</tbody>
</table>

2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].
Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

3. Structure of the MIB

The MIB is structured in the following way:

```
MIB-2 {1 3 6 1 2 1}
   |   +--(xxxx)m3uaMib
   |       +--(1) m3uaManagement
   |           +--(1) m3uaAttributes
   |               +--(1) m3uaConfig
   |               +--(2) m3uaStatistics
   |                   +--(2) m3uaTables
   +--(2) m3uaConformance
       +--(1) m3uaGroups
       +--(2) m3uaCompliances
           +--(1) m3uaAspCompliance
           +--(2) m3uaSgpIpspCompliance
```

where the following sections are described:

- m3uaManagement, where all the objects to manage M3UA are defined under this branch.
- m3uaAttributes: where general attributes values are placed. It is divided in:

  • m3uaConfig: where the general M3UA configuration parameters are listed.
  • m3uaStatistics: where general Statistics for M3UA are listed.

- m3uatables: where specific attributes for each element that can be defined and used to manage a M3UA Based System. Every table is structured in the following way:

  m3uaScopeTablename
    |    / \            
    m3uaScopeCfg   m3uaScopeStat

These tables hold data for:

- Asp: Tables that are implemented in ASP Agents.
- SgpIsp: Tables that are implemented in both SGP and IPSP Agents.
- Gen: Tables implemented in all ASP, SGP and IPSP Agents.

- m3uaConformance, for the Unit of Conformance.

- m3uaGroups: M3UA MIB variables have been grouped according to their functionality and the context they belong to.

- m3uaCompliances: minimal list of objects in the M3UA MIB module that an agent developer must implement.

3.1 Management

3.1.1 Attributes

3.1.1.1 Protocol General Variables

The first section of the MIB contains the general variables of the M3UA protocol. Maximum, minimum and initial values can be found here.

3.1.1.2 Protocol General Statistics

Statistics included here relate to the whole M3UA layer. Statistics per association are defined inside specific association tables.
3.1.2 ASP Tables

All the tables included within this branch, are tables to be located in the ASP node. These tables will show remote (SGP) or local (ASP) nodes parameters.

The tables have been divided into Configuration Tables (Cfg) and Statistic Tables (Stat).

3.1.2.1 Destination Table

The destination table is composed of all the parameters needed to find the right SG to reach the SS7 destination. The addressing parameters that are needed are: Network Appearance (NA) that univocally reference the network where the message is sent, and Destination Point Code (DPC), which is the final address in the SS7 domain.

Each final destination within the SS7 domain can be reached through one or more Signaling Gateways (SGs). The state of the destination may be different for each SG and AS pairs.

The result of this table would be the final destination state. An SS7 node may be available, unavailable, congested, restricted or unknown. There may be certain cases where its state is unknown, e.g. after initialization.

```mib-2 {1 3 6 1 2 1}
   +----(xxxx) m3uaMib
   |     +--(1) m3uaManagement
   |         :                 +--(2) m3uaTables
   |         :                 |     +--(1) m3uaAsp
   |         :                 |         +--(1) m3uaAspCfg
   |         :                 |         |     +--(1) m3uaAspDestTable
   |         :                 |         |         +--(1) m3uaAspDestNa (index)
   |         :                 |         |         +--(2) m3uaAspDestDpc (index)
   |         :                 |         +--(3) m3uaAspDestSgId (index)
```
3.1.2.2 Signaling Gateway Process Table

This table compiles the SGPs that serve a SG. An SGP may be only activated for certain ASes.

The result of the table is the status of the AS through a specific SGP.

mib-2 {1 3 6 1 2 1}
  +--(xxxx) m3uaMib
    | +--(1) m3uaManagement
    |     : 
    |     : 
    |     +--(2) m3uaTables
    |         : ++-(1) m3uaAsp
    |         :     : 
    |         :     :    ++-(1) m3uaAspCfg
    |         :     :  
    |         :     :    ++-(2) m3uaAspSgpTable
    |         :     :      : ++-(1) m3uaAspSgpAsId (index)
    |         :     :      :     ++-(2) m3uaAspSgpSgId (index)
    |         :     :      :     ++-(3) m3uaAspSgpId (index)
    |         :     :      :     ++-(4) m3uaAspSgpState

3.1.2.3 Association Table
From an ASP point of view, an SGP can be reached using the association established to it. This table allows to know the identification for the association to a concrete SGP as well as the SCTP streams constraints imposed by M3UA to the lower layer.

```
mib-2 {1 3 6 1 2 1}
  +--(xxxx) m3uaMib
  |    |  
  |    +--(1) m3uaManagement
  |         |  
  |         +--(2) m3uaTables
  |                   |  
  |                   +--(1) m3uaAsp
  |                       |  
  |                       +--(1) m3uaAspCfg
  |                               |  
  |                               +--(3) m3uaAspAssocTable
  |                                               |  
  |                                               +--(1) m3uaAspAssocSgpId (index)
  |                                               |  
  |                                               +--(2) m3uaAspAssocId
  |                                               |  
  |                                               +--(3) m3uaAspAssocMinOutStreams
  |                                               |  
  |                                               +--(4) m3uaAspAssocMaxInStreams
```

### 3.1.2.4 Routing Context Table

The Routing Context (RC) is an optional parameter as per RFC3332. When this parameter is used by an M3UA implementation, this table will show the values that it takes.

RC scope is per SGP where each AS has an associated RC value.

```
mib-2 {1 3 6 1 2 1}
  +--(xxxx) m3uaMib
  |    |  
  |    +--(1) m3uaManagement
  |         |  
  |         +--(1) m3uaAspCfg
  |                               |  
  |                               +--(3) m3uaAspAssocTable
  |                                               |  
  |                                               +--(1) m3uaAspAssocSgpId (index)
  |                                               |  
  |                                               +--(2) m3uaAspAssocId
  |                                               |  
  |                                               +--(3) m3uaAspAssocMinOutStreams
  |                                               |  
  |                                               +--(4) m3uaAspAssocMaxInStreams
```
3.1.2.5 ASP Statistics Table

It defines statistics specific to an Application Server Process.

Statistics applicable to SGP, ASP and IPSP are covered in the generic statistics table.

mib-2 {1 3 6 1 2 1}
  +--(xxxx) m3uaMib
    |   |
    |   +--(1) m3uaManagement
    |   |   |
    |   |   +--(2) m3uaTables
    |   |       |
    |   |       +--(1) m3uaAsp
    |   |           |
    |   |           +--(1) m3uaAspCfg
    |   |                   |
    |   |                   +--(3) m3uaAspRcTable
    |   |                   |   |
    |   |                   |   +--(1) m3uaAspRcSgpId (index)
    |   |                   |       |
    |   |                   |       +--(2) m3uaAspRcAsId (index)
    |   |                   |               |
    |   |                   |               +--(3) m3uaAspRcValue
    |   |
    |   +--(2) m3uaAspStat
    |       |
    |       +--(1) m3uaAspStatTable
    |           |
    |           +--(1) m3uaAspStatAssocId (index)
    |               |
    |               +--(2) m3uaAspStatAspupOut
    |               |   |
    |               |   +--(3) m3uaAspStatAspacOut
    |               |
    |               +--(3) m3uaAspStatAspacOut
3.1.3 SGP/IPSP Tables

All the tables included within this branch are tables to be located in the SGP or IPSP node. These tables will show remote (ASP/IPSP) node parameters.

The tables have been divided into Configuration Tables (Cfg) and Statistics Tables (Stat).

3.1.3.1 Routing Table

The Routing table contains a list of routing keys, which translate to an Application Server ID and a corresponding Routing Context.

As a Routing Key may be composed of any combination of basic SS7 routing elements, if an element is not included in the routing key, a default value is assigned. This default value can continue being considered as an indexing value itself.
3.1.3.2 Application Server (AS) Table

The Application Server table contains information on the state and traffic mode of each Application for which one or more routing keys can exist in the Signalling Gateway or IPSP routing table.

mib-2 (1 3 6 1 2 1)
  +--(xxxx) m3uaMib
  |    +--(1) m3uaManagement
  |       |    +--(2) m3uaTables
  |       |       +--(2) m3uaSgpIpsp
  |       |           +--(1) m3uaSgpIpspCfg
  |       |           +--(1) m3uaSgpIpspRtgTable
  |       |           |    +--(1) m3uaSgpIpspRtgNa (index)
  |       |           |    +--(2) m3uaSgpIpspRtgDpc (index)
  |       |           |    +--(3) m3uaSgpIpspRtgSi (index)
  |       |           |    +--(4) m3uaSgpIpspRtgOpc (index)
  |       |           |    +--(5) m3uaSgpIpspRtgAsId
  |       |           |    +--(6) m3uaSgpIpspRtgRc
3.1.3.3 Application Server Process (ASP) Table

This table shows the State of the Application Server Process or IPSP for each Application Server, and the role of the ASP in the AS traffic distribution, according to each AS traffic mode.
3.1.3.4 Application Server Process (ASP) Association Table

It defines data related to the SCTP Association for an Application Server Process or IPSP.

Further Association data can be obtained from the SCTP MIB.

3.1.3.5 SGP / IPSP Statistics Table

It defines statistics specific to a Signaling Gateway Process or IP Signaling Process.
Statistics applicable to SGP, ASP and IPSP are covered in the generic statistics table.

For the IPSP, the ASP Statistics table also applies.

The table contains statistics data related to the M3UA messages exchanged through each association at the SGP or IPSP.

```
  mib-2 {1 3 6 1 2 1}
    +--(xxxx) m3uaMib
    |    +--(1) m3uaManagement
    |         :    +--(2) m3uaTables
    |         :    :    +--(2) m3uaSgpIpsp
    |         :    :        +--(2) m3uaSgpIpspStat
    |         :    :         +--(1) m3uaSgpIpspStatTable
    |         :    :             +--(1) m3uaSgpIpspStatAssocId (index)
    |         :    :                 +--(2) m3uaSgpIpspStatAspupAckOut
    |         :    :                 +--(3) m3uaSgpIpspStatAspacAckOut
    |         :    :                 +--(4) m3uaSgpIpspStatAspdnAckOut
    |         :    :                 +--(5) m3uaSgpIpspStatAspiaAckOut
    |         :    :                 +--(6) m3uaSgpIpspStatAspupIn
    |         :    :                 +--(7) m3uaSgpIpspStatAspacIn
    |         :    :                 +--(8) m3uaSgpIpspStatAspdnIn
    |         :    :                 +--(9) m3uaSgpIpspStatAspiaIn
```
3.1.4 Generic Tables

3.1.4.1 Network Appearance Table

It defines the data specific to a Network Appearance.

mib-2 {1 3 6 1 2 1}
  +--(xxxx) m3uaMib
  |   +--(1) m3uaManagement
  |   |   +--(2) m3uaTables
  |   |   |   +--(3) m3uaGen
  |   |   |   |   +--(1) m3uaGenCfg
  |   |   |   |   |   +--(1) m3uaGenNaTable
  |   |   |   |   |   |   +--(1) m3uaGenNaValue (index)
  |   |   |   |   |   |   |   +--(2) m3uaGenNaNi
  |   |   |   |   |   |   |   |   +--(3) m3uaGenNaMtp3ProtType
  |   |   |   |   |   |   |   |   |   +--(4) m3uaGenNaMtp3ProtVariant
  |   |   |   |   |   |   |   |   |   |   +--(5) m3uaGenNaMtp3ProtVersion
3.1.4.2 Generic Statistics Table

Defines statistics common to Application Server Processes, Signaling Gateway Processes and IP Signaling Processes.

The table contains statistics data related to the M3UA messages exchanged through each association at the Signaling Process.

mib-2 {1 3 6 1 2 1}
   +--(xxxx) m3uaMib
   |   +--(1) m3uaManagement
   |   |   +--(2) m3uaTables
   |   |   |   +--(3) m3uaGen
   |   |   |   |   +--(2) m3uaGenStat
   |   |   |   |   |   +--(1) m3uaGenStatTable
   |   |   |   |   |   |   +--(1) m3uaGenStatAssocId (index)
   |   |   |   |   |   |   |   +--(2) m3uaGenStatAssocDataOut
   |   |   |   |   |   |   |   |   +--(3) m3uaGenStatAssocDataIn
   |   |   |   |   |   |   |   |   |   +--(4) m3uaGenStatAssocErrorOut
   |   |   |   |   |   |   |   |   |   |   +--(5) m3uaGenStatAssocErrorIn
   |   |   |   |   |   |   |   |   |   |   |   +--(6) m3uaGenStatAssocSconOut
   |   |   |   |   |   |   |   |   |   |   |   |   +--(7) m3uaGenStatAssocSconIn
3.2 Conformance

3.2.1 Groups

This section includes all the variables defined in the MIB grouped by function.

3.2.2 Compliance

Requirements of the M3UA MIB to be implemented.

4. Definitions

M3UA-MIB DEFINITIONS ::= BEGIN

IMPORTS
MODULE-IDENTITY, OBJECT-TYPE, Unsigned32, Counter32, Counter64, mib-2
FROM SNMPv2-SMI -- RFC 2578

TruthValue
FROM SNMPv2-TC -- RFC2579

MODULE-COMPLIANCE, OBJECT-GROUP
FROM SNMPv2-CONF -- RFC 2580

;

m3uaMIB MODULE-IDENTITY
LAST-UPDATED "200306050000Z" -- 5th June 2003
ORGANIZATION "IETF SIGTRAN Working Group"
CONTACT-INFO
"WG EMail: sigtran@ietf.org
Web Page:
http://www.ietf.org/html.charters/sigtran-charter.html
Chair: Lyndon Ong
Ciena Corporation
0480 Ridgeview Drive
Cupertino, CA 95014
USA
Tel:
Email: lyong@ciena.com
DESCRIPTION
"The MIB module for managing M3UA implementations."

Copyright (C) The Internet Society (2003). This version of this
MIB module is part of RFC YYYY; see the RFC itself for full
legal notices."

REVISION "200306050000Z" -- 5th June 2003

DESCRIPTION " Initial version, published as RFC YYYY"
-- RFC Editor: to assign YYYY

 ::= { mib-2 xxxx }

-- IANA: to assign xxxx
-- RFC Editor: to change xxxx into the value assigned by IANA
-- Top-level structure of the MIB

m3uaManagement OBJECT IDENTIFIER ::= { m3uaMIB 1 }
m3uaConformance OBJECT IDENTIFIER ::= { m3uaMIB 2 }
m3uaAttributes OBJECT IDENTIFIER ::= { m3uaManagement 1 }
m3uaConfig OBJECT IDENTIFIER ::= { m3uaAttributes 1 }
m3uaStatistics OBJECT IDENTIFIER ::= { m3uaAttributes 2 }
m3uaTables OBJECT IDENTIFIER ::= { m3uaManagement 2 }

m3uaAsp OBJECT IDENTIFIER ::= { m3uaTables 1 }
m3uaAspCfg OBJECT IDENTIFIER ::= { m3uaAsp 1 }
-- m3uaAspDestTable OBJECT IDENTIFIER ::= { m3uaAspCfg 1 }
-- m3uaAspSgpTable OBJECT IDENTIFIER ::= { m3uaAspCfg 2 }
-- m3uaAspAssocTable OBJECT IDENTIFIER ::= { m3uaAspCfg 3 }
-- m3uaAspRcTable OBJECT IDENTIFIER ::= { m3uaAspCfg 4 }
m3uaAspStat OBJECT IDENTIFIER ::= { m3uaAsp 2 }
-- m3uaAspStatTable OBJECT IDENTIFIER ::= { m3uaAspStat 1 }

m3uaSgpIpsp OBJECT IDENTIFIER ::= { m3uaTables 2 }
m3uaSgpIpspCfg OBJECT IDENTIFIER ::= { m3uaSgpIpsp 1 }
-- m3uaSgpIpspRtgTable OBJECT IDENTIFIER ::= { m3uaSgpIpspCfg 1 }
-- m3uaSgpIpspAsTable OBJECT IDENTIFIER ::= { m3uaSgpIpspCfg 2 }
-- m3uaSgpIpspAspTable OBJECT IDENTIFIER ::= { m3uaSgpIpspCfg 3 }
-- m3uaSgpIpspAssocTable OBJECT IDENTIFIER ::= { m3uaSgpIpspCfg 4 }
m3uaSgpIpspStat OBJECT IDENTIFIER ::= { m3uaSgpIpsp 2 }
-- m3uaSgpIpspStatTable OBJECT IDENTIFIER ::= { m3uaSgpIpspStat 1 }

m3uaGen OBJECT IDENTIFIER ::= { m3uaTables 3 }
m3uaGenCfg OBJECT IDENTIFIER ::= { m3uaGen 1 }
-- m3uaGenNaTable OBJECT IDENTIFIER ::= { m3uaGenCfg 1 }
m3uaGenStat OBJECT IDENTIFIER ::= { m3uaGen 2 }
-- m3uaGenStatTable OBJECT IDENTIFIER ::= { m3uaGenStat 1 }

-- M3UA MANAGEMENT
---
-- ATTRIBUTES - CONFIGURATION

m3uaVersion OBJECT-TYPE
SYNTAX     Unsigned32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "Identifies the current version of the M3UA."
 ::= { m3uaConfig 1 }

m3uaProcType OBJECT-TYPE
SYNTAX     INTEGER {
    sgp(1), -- Signaling Gateway Process
    asp(2), -- Application Server Process
    ipsp(3) -- IP Server Process
}
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "This variable indicates the type of the process where the
    M3UA layer is located."
 ::= { m3uaConfig 2 }

m3uaLocalPort OBJECT-TYPE
SYNTAX     Unsigned32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "Identifies the port of the M3UA service. Well-known Port for
    M3UA is 2905."
DEFVAL 2905 -- well-known port assigned by IANA to M3UA
 ::= { m3uaConfig 3 }

m3uaTrInitValue OBJECT-TYPE
SYNTAX     Unsigned32
UNITS      "milliseconds"
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
    "Initial value of the Failover timer Tr. Tr set with value 0
    disables buffering."
DEFVAL 3000 -- 3000 milliseconds it is the recommended value
 ::= { m3uaConfig 4 }
m3uaTPAudInitValue OBJECT-TYPE
SYNTAX Unsigned32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Initial value of the Periodic Audit timer TPAud."
DEFVAL {5000} -- 5000 milliseconds it's the recommended value
::= { m3uaConfig 5 }

m3uaHeartBeat OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Activates or deactivates the heartbeat procedure at M3UA level.

When the object is set to 'true' (1), the heartbeat procedure is enabled.

When the object is set to 'false' (2), Heartbeat is disabled. No BEAT messages are sent but the BEAT messages received are responded."
::= { m3uaConfig 6 }

m3uaTBeatInitValue OBJECT-TYPE
SYNTAX Unsigned32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Initial value of the HeartBeat timer TBeat."
DEFVAL {1000} -- 1000 milliseconds is the recommended value
::= { m3uaConfig 7 }

m3uaTAckInitValue OBJECT-TYPE
SYNTAX Unsigned32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Initial value of the Retransmission timer TAck."
DEFVAL (2000) -- 2000 milliseconds is the recommended value

::= { m3uaConfig 8 }

m3uaFailOverBuffSize OBJECT-TYPE
SYNTAX Unsigned32
UNITS "bytes"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Size of the failover retransmission buffer. Recommended value is 64 Kbytes. Only valid if failover buffer option has been set to ON."
DEFVAL (65535) -- Recommended value is 64 Kbytes

::= { m3uaConfig 12 }

-- ATTRIBUTES-STATISTICS

-- M3UA TABLES

-- ASP TABLES

-- CONFIG

-- DESTINATION TABLE
The Destination Table contains information about each destination that can be reached from the ASP where it is located.

m3uaAspDestTable OBJECT-TYPE
SYNTAX      SEQUENCE OF M3uaAspDestEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "A table containing per SS7 destination information. The state of destinations through each SG can be fetched per AS."
 ::= { m3uaAspCfg 1 }

m3uaAspDestEntry OBJECT-TYPE
SYNTAX      M3uaAspDestEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "Destination parameters and relation with SGs and ASes."
INDEX   { m3uaAspDestNa, m3uaAspDestDpc, m3uaAspDestSgId, m3uaAspDestAsId }
 ::= { m3uaAspDestTable 1 }

M3uaAspDestEntry ::= SEQUENCE {
   m3uaAspDestNa                 Unsigned32,
   m3uaAspDestDpc                Unsigned32,
   m3uaAspDestSgId               Unsigned32,
   m3uaAspDestAsId               Unsigned32,
   m3uaAspDestState              INTEGER
}

m3uaAspDestNa OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "Network Appearance. When this parameter is not used, Network Indicator parameter, as included in the MTP3 message, will be filled in."
 ::= { m3uaAspDestEntry 1 }

m3uaAspDestDpc OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION "Destination Point Code located in the SS7 network. It is the final destination for the message generated in the ASP which should reach the SS7 node traversing a Signaling Gateway."

::= { m3uaAspDestEntry 2 }

m3uaAspDestSgId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION "Signaling Gateway (SG) Identifier. It represents an SG that is in the way to the final DPC located in the SS7 network."

::= { m3uaAspDestEntry 3 }

m3uaAspDestAsId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION "Application Server (AS) Identifier. It represents an AS that is being served by the ASP. A specific destination address could be reachable or not from the ASP, depending on each AS this ASP is serving to."

::= { m3uaAspDestEntry 4 }

m3uaAspDestState OBJECT-TYPE
SYNTAX      INTEGER {
    unknown (1),
    available(2),
    unavailable(3),
    congested(4),
    restricted(5)
} 
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION "Destination reachability status. It is the status of the Signaling Point that is the final destination of a message within the SS7 network when the message travels through the Signaling Gateway (SG) identified by the m3uaAspDestSgId object."
::= { m3uaAspDestEntry 5 }

-- M3UA TABLES

-- ASP TABLES

-- CONFIG

-- SIGNALING GATEWAY PROCESS TABLE

-- The SGP Table contains information about the SGPs per SG that can be
-- reached from this ASP. It shows the state of each AS at each remote
-- SGP.

m3uaAspSgpTable OBJECT-TYPE
SYNTAX      SEQUENCE OF M3uaAspSgpEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "A table containing SGP status information for each SG that
  is communicating with an AS served by this ASP."
::= { m3uaAspSgpTable 1 }

M3uaAspSgpEntry ::= SEQUENCE {
m3uaAspSgpAsId                Unsigned32,
m3uaAspSgpSgId                Unsigned32,
m3uaAspSgpId                  Unsigned32,
}
m3uaAspSgpState  INTEGER

m3uaAspSgpAsId  OBJECT-TYPE
   SYNTAX Unsigned32
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
      "Application Server (AS) Identifier. It represents an AS that
       is being served by the ASP."
   ::= { m3uaAspSgpEntry 1 }

m3uaAspSgpSgId  OBJECT-TYPE
   SYNTAX Unsigned32
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
      "Signaling Gateway (SG) Identifier. It represents an SG
       composed of the SGPs identified by m3uaAspSgpId."
   ::= { m3uaAspSgpEntry 2 }

m3uaAspSgpId  OBJECT-TYPE
   SYNTAX Unsigned32
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
      "Signaling Gateway Process (SGP) Identifier. It represents an
       SGP that is serving the Signaling Gateway (SG) identified by
       the m3uaAspSgpSgId object."
   ::= { m3uaAspSgpEntry 3 }

m3uaAspSgpState  OBJECT-TYPE
   SYNTAX INTEGER {
      unknown (1),
      active(2),
      inactive(3),
      down(4)
   }  
   MAX-ACCESS read-only 
   STATUS current 
   DESCRIPTION 
      "AS state through each SGP in the SG."
::= { m3uaAspSgpEntry 4 }

-- M3UA TABLES

-- ASP TABLES

-- CONFIG

-- ASSOCIATION TABLE

-- The Association Table contains information about the association
-- towards each SGP that can be reached from this ASP when serving to any
-- of its ASes. Limits of the streams that are data for the lower layer
-- (SCTP) are also included.

m3uaAspAssocTable OBJECT-TYPE
SYNTAX      SEQUENCE OF M3uaAspAssocEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"A table containing SCTP association information information
for each SGP that is communicating with this ASP."

::= { m3uaAspCfg 3 }

m3uaAspAssocEntry OBJECT-TYPE
SYNTAX      M3uaAspAssocEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"SCTP related parameters. There will be one association to
each of the SGPs that this ASP has to talk to."
INDEX   { m3uaAspAssocSgpId }

 ::= { m3uaAspAssocTable 1 }

M3uaAspAssocEntry ::= SEQUENCE {
  m3uaAspAssocSgpId          Unsigned32,
m3uaAspAssocId  Unsigned32,
m3uaAspAssocMinOutStreams  Unsigned32,
m3uaAspAssocMaxInStreams  Unsigned32
)

m3uaAspAssocSgpId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Signaling Gateway Process (SGP) Identifier. It represents an
SGP."
::= { m3uaAspAssocEntry 1 }

m3uaAspAssocId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Association Identification. It is the value that identifies
the association that is established between this ASP and the
SGP represented by m3uaAspAssocSgpId. This value is extracted
from the SCTP association Id value returned by SCTP when the
association is established to that endpoint. It is the link
to get the transport values from the SCTP MIB."
::= { m3uaAspAssocEntry 2 }

m3uaAspAssocMinOutStreams OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"If the SCTP association is initiated from this ASP,
this will be the minimum number of outgoing streams that is
requested to the remote peer at association start up."
::= { m3uaAspAssocEntry 3 }

m3uaAspAssocMaxInStreams OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  read-only
It is the maximum number of input streams that this application can support. It is used during the Association establishment phase.

::= { m3uaAspAssocEntry 4 }

-- The Routing Context (RC) Table contains information about the association towards each SGP that can be reached from this ASP when serving to any of its ASes.

m3uaAspRcTable OBJECT-TYPE
SYNTAX SEQUENCE OF M3uaAspAssocEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table containing the Routing Context (RC) values for each SGP-AS relationship. As indicated in the M3UA RFC, the RC values are SGP scoped."

::= { m3uaAspCfg 4 }

m3uaAspRcEntry OBJECT-TYPE
SYNTAX M3uaAspRcEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"RC value for each AS as assigned by the SGP."
INDEX { m3uaAspRcSgpId, m3uaAspRcAsId }

::= { m3uaAspRcTable 1 }
M3uaAspRcEntry ::= SEQUENCE {
    m3uaAspRcSgpId                Unsigned32,
    m3uaAspRcAsId                 Unsigned32,
    m3uaAspRcValue                Unsigned32
}

m3uaAspRcSgpId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  
"Signaling Gateway Process (SGP) Identifier. It represents an 
SGP that communicates with this ASP."
::= { m3uaAspRcEntry 1 }

m3uaAspRcAsId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  
"Application Server (AS) Identifier. It represents an AS that 
is being served by the ASP."
::= { m3uaAspRcEntry 2 }

m3uaAspRcValue OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION  
"This is the value for the Routing Context that is share 
between the SGP identified by communicatinm3uaAspRcSgpId 
object and this ASP when serving to AS identified by the 
m3uaAspRcAsId object."
::= { m3uaAspRcEntry 3 }

-- M3UA TABLES

-- ASP TABLES

-- STATISTICS
-- ASP STATISTICS TABLE

-- It defines statistics specific to an Application Server Process.
-- Statistics applicable to SGP, ASP and IPSP are covered in the generic
-- statistics table.

-- The table contains statistics data related to the M3UA messages
-- exchanged through each association at the ASP.

m3uaAspStatTable OBJECT-TYPE
SYNTAX     SEQUENCE OF M3uaAspStatEntry
MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION  "A table containing per association statistics."
::= { m3uaAspStat 1 }

m3uaAspStatEntry OBJECT-TYPE
SYNTAX      M3uaAspStatEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "It counts all the messages received and sent through a
specific association."
INDEX   { m3uaAspStatAssocId }
::= { m3uaAspStatTable 1 }

M3uaAspStatEntry ::= SEQUENCE {
  m3uaAspStatAssocId            Unsigned32,
  m3uaAspStatAspupOut           Counter32,
  m3uaAspStatAspacOut           Counter32,
  m3uaAspStatAspdnOut           Counter32,
  m3uaAspStatAspiaOut           Counter32,
  m3uaAspStatAspupAckIn         Counter32,
  m3uaAspStatAspacAckIn         Counter32,
  m3uaAspStatAspdnAckIn         Counter32,
  m3uaAspStatAspiaAckIn         Counter32,
  m3uaAspStatNotifyIn           Counter32,
  m3uaAspStatDaudOut            Counter32,
  m3uaAspStatDunaIn             Counter32,
  m3uaAspStatDavaIn             Counter32,
  m3uaAspStatDupuIn             Counter32
}
-- Association Statistics

-- ASPM Statistics per Association

m3uaAspStatAssocId OBJECT-TYPE
SYNTAX          Unsigned32
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION
"Association Identification. It is the value that identifies the association that is established between this ASP and the SGP represented by m3uaAspAssocSgpId. This value is extracted from the SCTP association Id value returned by SCTP when the association is established to that endpoint. It is the link to get the transport values from the SCTP MIB."

::= { m3uaAspStatEntry 1 }

m3uaAspStatAspupOut OBJECT-TYPE
SYNTAX          Counter32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
"Number of ASPUP messages sent through the association."

::= { m3uaAspStatEntry 2 }

m3uaAspStatAspacOut OBJECT-TYPE
SYNTAX          Counter32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
"Number of ASPAC messages sent through the association."

::= { m3uaAspStatEntry 3 }

m3uaAspStatAspdnOut OBJECT-TYPE
SYNTAX          Counter32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
"Number of ASPDN messages sent through the association."

::= { m3uaAspStatEntry 4 }

m3uaAspStatAspiaOut OBJECT-TYPE
SYNTAX           Counter32
MAX-ACCESS       read-only
STATUS           current
DESCRIPTION      "Number of ASPIA messages sent through the association."

 ::= { m3uaAspStatEntry 5 }

m3uaAspStatAspupAckIn OBJECT-TYPE
SYNTAX           Counter32
MAX-ACCESS       read-only
STATUS           current
DESCRIPTION      "Number of ASPUP ACK messages received through the association."

 ::= { m3uaAspStatEntry 6 }

m3uaAspStatAspacAckIn OBJECT-TYPE
SYNTAX           Counter32
MAX-ACCESS       read-only
STATUS           current
DESCRIPTION      "Number of ASPAC ACK messages received through the association."

 ::= { m3uaAspStatEntry 7 }

m3uaAspStatAspdnAckIn OBJECT-TYPE
SYNTAX           Counter32
MAX-ACCESS       read-only
STATUS           current
DESCRIPTION      "Number of ASPDN ACK messages received through the association."

 ::= { m3uaAspStatEntry 8 }

m3uaAspStatAspiaAckIn OBJECT-TYPE
SYNTAX           Counter32
MAX-ACCESS       read-only
STATUS           current
DESCRIPTION      "Number of ASPIA ACK messages received through the association."

 ::= { m3uaAspStatEntry 9 }
-- End of ASPM Statistics per Association

-- MGMT Statistics per Association

m3uaAspStatNotifyIn OBJECT-TYPE  
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION      "Number of NOTIFY messages received through the association."  
::= { m3uaAspStatEntry 10 }

-- End of MGMT Statistics per Association

-- SSNM Statistics per Association

m3uaAspStatDaudOut OBJECT-TYPE  
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION      "Number of DAUD messages sent through the association."  
::= { m3uaAspStatEntry 11 }

m3uaAspStatDunaIn OBJECT-TYPE  
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION      "Number of DUNA messages received through the association."  
::= { m3uaAspStatEntry 12 }

m3uaAspStatDavaIn OBJECT-TYPE  
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION      "Number of DAVA messages received through the association."  
::= { m3uaAspStatEntry 13 }

m3uaAspStatDupuIn OBJECT-TYPE
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION "Number of DUPU messages received through the association."  
::= { m3uaAspStatEntry 14 }  

-- End of SSNM Statistics per Association

-- M3UA TABLES

-- TABLES AT SGP/IPSP

-- CONFIG

-- ROUTING TABLE

-- The Routing table contains a list of routing keys, which translate to
-- an Application Server ID and a corresponding Routing Context.
-- As a Routing Key may be composed of any combination of basic SS7
-- routing elements, if an element is not included in the routing key,
-- a default value is assigned. This default value can continue being
-- considered as an indexing value itself.

m3uaSgpIpspRtgTable OBJECT-TYPE
SYNTAX SEQUENCE OF M3uaSgpIpspRtgEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table containing Routing-specific information."
::= { m3uaSgpIpspCfg 1 }

m3uaSgpIpspRtgEntry OBJECT-TYPE
SYNTAX M3uaSgpIpspRtgEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"General common variables for a Routing Key."

INDEX { m3uaSgpIpspRtgNa,
       m3uaSgpIpspRtgDpc,
       m3uaSgpIpspRtgSi,
       m3uaSgpIpspRtgOpc }

::= { m3uaSgpIpspRtgTable 1 }

M3uaSgpIpspRtgEntry ::= SEQUENCE {
   m3uaSgpIpspRtgNa             Unsigned32,
   m3uaSgpIpspRtgDpc            Unsigned32,
   m3uaSgpIpspRtgSi             Unsigned32,
   m3uaSgpIpspRtgOpc            Unsigned32,
   m3uaSgpIpspRtgAsId           Unsigned32,
   m3uaSgpIpspRtgRc             Unsigned32
}

m3uaSgpIpspRtgNa OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Network Appearance for that routing key. A default value
will be assigned if not present in the Routing Key."

::= { m3uaSgpIpspRtgEntry 1 }

m3uaSgpIpspRtgDpc OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Destination Point Code for that routing key. A default
value will be assigned if not present in the Routing Key.
Range: 0 - 16777215."

::= { m3uaSgpIpspRtgEntry 2 }

m3uaSgpIpspRtgSi OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"Service Indicator for that routing key. A default value
will be assigned if not present in the Routing Key.
Range: 2 - 10."
m3uaSgpIpspRtgOpc OBJECT-TYPE
SYNTAX        Unsigned32
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION   "Originating Point Code for that routing key. A default value will be assigned if not present in the Routing Key. Range: 0 to 16777215."

m3uaSgpIpspRtgAsId OBJECT-TYPE
SYNTAX        Unsigned32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION   "Application Server Identification Value."

m3uaSgpIpspRtgRc OBJECT-TYPE
SYNTAX        Unsigned32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION   "Routing Context for that routing key."

(-- M3UA TABLES
-- TABLES AT SGP/IPSP
-- CONFIG
-- APPLICATION SERVER (AS) TABLE
-- The Application Server table contains information on the state and

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-- traffic mode of each Application for which one or more routing keys
-- can exist in the Signalling Gateway or IPSP routing table.

m3uaSgpIpSpAsTable OBJECT-TYPE
SYNTAX SEQUENCE OF M3uaSgpIpSpAsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table containing Application Server-specific information."
::= { m3uaSgpIpSpCfg 2 }

m3uaSgpIpSpAsEntry OBJECT-TYPE
SYNTAX M3uaSgpIpSpAsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "General common variables for the Application Server"
INDEX { m3uaSgpIpSpAsId }
::= { m3uaSgpIpSpAsTable 1 }

M3uaSgpIpSpAsEntry ::= SEQUENCE {
    m3uaSgpIpSpAsId                     Unsigned32,
    m3uaSgpIpSpAsState                  INTEGER,
    m3uaSgpIpSpAsTmt                    INTEGER
}

m3uaSgpIpSpAsId OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Application Server Identification Value."
::= { m3uaSgpIpSpAsEntry 1 }

m3uaSgpIpSpAsState OBJECT-TYPE
SYNTAX INTEGER {
    active(1),
    inactive(2),
    down(3),
    pending(4)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Current Application Server State. Based on the state of the Application Server Processes which serve it."

::= { m3uaSgpIpspAsEntry 2 }

m3uaSgpIpspAsTmt OBJECT-TYPE
SYNTAX INTEGER {
      override(1),
      loadshare(2),
      broadcast(3)
    }
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Current Application Server Traffic Mode Type."
::= { m3uaSgpIpspAsEntry 3 }

-- M3UA TABLES
-- TABLES AT SGP/IPSP
-- CONFIG
-- APPLICATION SERVER PROCESS TABLE

-- This table shows the State of the Application Server Process or IPSP
-- for each Application Server, and the role of the ASP in the AS traffic
-- distribution, according to each AS traffic mode.

m3uaSgpIpspAspTable OBJECT-TYPE
SYNTAX SEQUENCE OF M3uaSgpIpspAspEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table containing Application Server Process-specific information."
::= { m3uaSgpIpspCfg 3 }

Roque, et al
m3uaSgpIpspAspEntry OBJECT-TYPE
SYNTAX      M3uaSgpIpspAspEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "General common variables for the Application Server Process."
INDEX   { m3uaSgpIpspAspAsId,
            m3uaSgpIpspAspId } 
 ::= { m3uaSgpIpspAspTable 1 }

M3uaSgpIpspAspEntry ::= SEQUENCE {
    m3uaSgpIpspAspAsId                        Unsigned32,
    m3uaSgpIpspAspId                          Unsigned32,
    m3uaSgpIpspAspState                       INTEGER,
    m3uaSgpIpspAspRole                        INTEGER
}

m3uaSgpIpspAspAsId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "Application Server Identification Value."
 ::= { m3uaSgpIpspAspEntry 1 }

m3uaSgpIpspAspId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  " Application Server Process Identification Value."
 ::= { m3uaSgpIpspAspEntry 2 }

m3uaSgpIpspAspState OBJECT-TYPE
SYNTAX      INTEGER {
            aspDown(1),
            aspUp(2),
            aspActive(3)

    } MAX-ACCESS read-only
STATUS      current
DESCRIPTION

"The state of this Application Server Process for a given AS."

::= { m3uaSgpIpspAspEntry 3 }

m3uaSgpIpspAspRole OBJECT-TYPE
SYNTAX INTEGER {
    primary(1),
    backup(2),
    loadsharing(3),
    broadcast (4)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The role of this Application Server Process within the traffic mode for each AS."

::= { m3uaSgpIpspAspEntry 4 }

-----------------------------------------------------------------------
-- M3UA TABLES
-----------------------------------------------------------------------
-- TABLES AT SGP/IPSP
-----------------------------------------------------------------------
-- CONFIG
-----------------------------------------------------------------------
-- APPLICATION SERVER PROCESS (ASP) ASSOCIATION TABLE
-----------------------------------------------------------------------

-- Defines data related to the SCTP Association for an Application Server
-- Process or IPSP.
-- Further Association data can be obtained from the SCTP MIB.

m3uaSgpIpspAssocTable OBJECT-TYPE
SYNTAX  SEQUENCE OF M3uaSgpIpspAssocEntry
MAX-ACCESS not-accessible
STATUS   current
DESCRIPTION "A table containing ASP/IPSP Association-specific information."

::= { m3uaSgpIpspCfg 4 }
m3uaSgpIpspAssocEntry OBJECT-TYPE
SYNTAX M3uaSgpIpspAssocEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"General common variables for the Association for an
ASP."
INDEX { m3uaSgpIpspAssocAspId }
::= { m3uaSgpIpspAssocTable 1 }

M3uaSgpIpspAssocEntry ::= SEQUENCE {
m3uaSgpIpspAssocAspId                  Unsigned32,
m3uaSgpIpspAssocId                     Unsigned32,
m3uaSgpIpspAssocMinOutStreams          Unsigned32,
m3uaSgpIpspAssocMaxInStreams           Unsigned32
}

m3uaSgpIpspAssocAspId OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
" Application Server Process Identification Value."
::= { m3uaSgpIpspAssocEntry 1 }

m3uaSgpIpspAssocId  OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Association Identification. Value identifying the
association for that ASP. This value is extracted from
the SCTP association Id value returned by SCTP when the
association is established to that endpoint."
::= { m3uaSgpIpspAssocEntry 2 }

m3uaSgpIpspAssocMinOutStreams OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"If the SCTP association is initiated from this ASP,
this will be the minimum number of outgoing streams that is
"It is the maximum number of input streams that this application can support. It is used during the Association establishment phase."

::= { m3uaSgpIpspAssocEntry 4 }

---

**m3uaSgpIpspAssocMaxInStreams**

**OBJECT-TYPE**

**SYNTAX** Unsigned32

**MAX-ACCESS** read-only

**STATUS** current

**DESCRIPTION**

"It is the maximum number of input streams that this application can support. It is used during the Association establishment phase."

::= { m3uaSgpIpspAssocEntry 4 }

---

**m3uaSgpIpspStatTable**

**OBJECT-TYPE**

**SYNTAX** SEQUENCE OF M3uaSgpIpspStatEntry

**MAX-ACCESS** not-accessible

---

It defines statistics specific to a Signaling Gateway Process or IP Signaling Process.

Statistics applicable to SGP, ASP and IPSP are covered in the generic statistics table.

For the IPSP, the ASP Statistics table also applies.

The table contains statistics data related to the M3UA messages exchanged through each association at the SGP or IPSP.
A table containing per association statistics.

m3uaSgpIpspStatTable  OBJECT-TYPE
SYNTAX        M3uaSgpIpspStatTable
MAX-ACCESS not-accessible
STATUS       current
DESCRIPTION  "It counts all the messages received and sent through a specific association."
INDEX       { m3uaSgpIpspStatAssocId }

-- Association Statistics

m3uaSgpIpspStatAssocId  OBJECT-TYPE
SYNTAX       Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "Association Identification. It is the value that identifies the association that is established between this SGP or IPSP and the remote ASP or IPSP. This value is extracted from the SCTP association Id value returned by SCTP when the
association is established to that endpoint. It is the link
to get the transport values from the SCTP MIB.

::= { m3uaSgpIpspStatEntry 1 }

m3uaSgpIpspStatAspupAckOut OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS  current
DESCRIPTION
  "Number of ASPUP ACK messages sent through the association."

::= { m3uaSgpIpspStatEntry 2 }

m3uaSgpIpspStatAspacAckOut OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS  current
DESCRIPTION
  "Number of ASPAC ACK messages sent through the association."

::= { m3uaSgpIpspStatEntry 3 }

m3uaSgpIpspStatAspdnAckOut OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS  current
DESCRIPTION
  "Number of ASPDN ACK messages sent through the association."

::= { m3uaSgpIpspStatEntry 4 }

m3uaSgpIpspStatAspiaAckOut OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS  current
DESCRIPTION
  "Number of ASPIA ACK messages sent through the association."

::= { m3uaSgpIpspStatEntry 5 }

m3uaSgpIpspStatAspupIn OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS  current
DESCRIPTION
  "Number of ASPUP messages received through the association."
::= { m3uaSgpIpspStatEntry 6 }

m3uaSgpIpspStatAspacIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of ASPAC messages received through the association."
::= { m3uaSgpIpspStatEntry 7 }

m3uaSgpIpspStatAspdnIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of ASPDN messages received through the association."
::= { m3uaSgpIpspStatEntry 8 }

m3uaSgpIpspStatAspiaIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of ASPIA messages received through the association."
::= { m3uaSgpIpspStatEntry 9 }

-- End of ASPM Statistics per Association

-- MGMT Statistics per Association

m3uaSgpIpspStatNotifyOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of NOTIFY messages sent through the association."
::= { m3uaSgpIpspStatEntry 10 }

-- End of MGMT Statistics per Association

-- SSNM Statistics per Association
m3uaSgpIpspStatDunaOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
   "Number of DUNA messages sent through the association."
 ::= { m3uaSgpIpspStatEntry 11 }

m3uaSgpIpspStatDavaOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
   "Number of DAVA messages sent through the association."
 ::= { m3uaSgpIpspStatEntry 12 }

m3uaSgpIpspStatDupuOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
   "Number of DUPU messages sent through the association."
 ::= { m3uaSgpIpspStatEntry 13 }

m3uaSgpIpspStatDaudIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
   "Number of DAUD messages received through the association."
 ::= { m3uaSgpIpspStatEntry 14 }

-- End of SSNM Statistics per Association

-- M3UA TABLES

-- GENERIC

-- CONFIG

-- NETWORK APPEARANCE TABLE
m3uaGenNaTable OBJECT-TYPE
SYNTAX      SEQUENCE OF M3uaGenNaEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "A table containing Network Appearance-specific information"
 ::= { m3uaGenCfg 1 }

m3uaGenNaEntry  OBJECT-TYPE
SYNTAX      M3uaGenNaEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "General common variables for a Network Appearance."
INDEX   { m3uaGenNaValue }
 ::= { m3uaGenNaTable  1 }

M3uaGenNaEntry ::= SEQUENCE {
    m3uaGenNaValue                        Unsigned32,
    m3uaGenNaNi                           Unsigned32,
    m3uaGenNaMtp3ProtType                 INTEGER,
    m3uaGenNaMtp3ProtVariant              Unsigned32,
    m3uaGenNaMtp3ProtVersion              Unsigned32
 }

m3uaGenNaValue OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "Network Appearance Value."

 ::= { m3uaGenNaEntry  2 }

m3uaGenNaNi OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Identifies the Network Indicator of the SG Node in the
    SS7 Network."

 ::= { m3uaGenNaEntry  3 }

Roque, et al                                                    [Page 49]
m3uaGenNaMtp3ProtType OBJECT-TYPE
SYNTAX INTEGER {
    itu(1),
    ansi(2),
    china(3),
    ttc(4),
    other(5)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The MTP3 protocol type for this NA."
::= { m3uaGenNaEntry 4 }

m3uaGenNaMtp3ProtVariant OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The MTP3 protocol variant for this NA."
::= { m3uaGenNaEntry 5 }

m3uaGenNaMtp3ProtVersion OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The MTP3 protocol version for this NA."
::= { m3uaGenNaEntry 6 }

-- M3UA TABLES
-- GENERIC
-- STATISTICS
-- GENERIC STATISTICS TABLE

-- Defines statistics common to Application Server Processes,
-- Signaling Gateway Processes and IP Signaling Processes.

-- The table contains statistics data related to the M3UA messages
-- exchanged through each association at the Signaling Process.

m3uaGenStatTable OBJECT-TYPE
SYNTAX      SEQUENCE OF M3uaGenStatEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "A table containing per association statistics."
 ::= { m3uaGenStat 1 }

m3uaGenStatEntry OBJECT-TYPE
SYNTAX      M3uaGenStatEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "It counts all the messages received and sent through a
specific association."
INDEX       { m3uaGenStatAssocId }
 ::= { m3uaGenStatTable 1 }

M3uaGenStatEntry ::= SEQUENCE {
    m3uaGenStatAssocId            Unsigned32,
    m3uaGenStatDataOut            Counter32,
    m3uaGenStatDataIn             Counter32,
    m3uaGenStatErrorOut           Counter32,
    m3uaGenStatErrorIn            Counter32,
    m3uaGenStatSconOut            Counter32,
    m3uaGenStatSconIn             Counter32
}

-- Association Statistics

-- DATA Statistics per Association

m3uaGenStatAssocId OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

"Association Identification. It is the value that identifies the association that is established between an ASP and an SGP or between 2 IPSPs. This value is extracted from the SCTP association Id value returned by SCTP when the association is established to that endpoint. It is the link to get the transport values from the SCTP MIB."
::= { m3uaGenStatEntry 1 }

m3uaGenStatDataOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of DATA messages sent through the association."
::= { m3uaGenStatEntry 2 }

m3uaGenStatDataIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of DATA messages received through the association."
::= { m3uaGenStatEntry 3 }

-- End of DATA Statistics per Association

-- MGMT Statistics per Association

m3uaGenStatErrorOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of ERROR messages sent through the association."
::= { m3uaGenStatEntry 4 }

m3uaGenStatErrorIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of ERROR messages received through the association."
::= { m3uaGenStatEntry 5 }

-- End of MGMT Statistics per Association
-- SSNM Statistics per Association

m3uaGenStatSconOut OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of SCON messages sent through the association."
::= { m3uaGenStatEntry 6 }

m3uaGenStatSconIn OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of SCON messages received through the association."
::= { m3uaGenStatEntry 7 }

-- End of SSNM Statistics per Association

-- 4.1 Conformance Information

m3uaCompliances OBJECT IDENTIFIER ::= { m3uaConformance 1 }
m3uaGroups OBJECT IDENTIFIER ::= { m3uaConformance 2 }

-- 4.1.1 Units of conformance

m3uaAttributesGroup OBJECT-GROUP
OBJECTS { m3uaVersion,
m3uaProcType,
m3uaLocalPort,
m3uaTrValue,
m3uaTBeatValue,
m3uaTAckValue,
m3uaTPaudValue,
m3uaHeartBeat,
m3uaFailOverBuffSize,
m3uaRoutingFailures
}
STATUS current
DESCRIPTION "The m3ua group of objects providing for management of M3UA entities. Common parameters for the protocol."
m3uaAspCfgGroup OBJECT-GROUP

OBJECTS  
  m3uaAspDestState,
  m3uaAspSgpState,
  m3uaAspAssocId,
  m3uaAspAssocMinOutStreams,
  m3uaAspAssocMaxInStreams,
  m3uaAspRcValue

STATUS    current
DESCRIPTION
  "The m3ua group of objects to describe configuration values at the Application Server Process (ASP)."

m3uaAspStatsGroup OBJECT-GROUP

OBJECTS  
  m3uaAspStatAspupOut,
  m3uaAspStatAspacOut,
  m3uaAspStatAspdnOut,
  m3uaAspStatAspiaOut,
  m3uaAspStatAspupAckIn,
  m3uaAspStatAspacAckIn,
  m3uaAspStatAspdnAckIn,
  m3uaAspStatAspiaAckIn,
  m3uaAspStatNotifyIn,
  m3uaAspStatDaudOut,
  m3uaAspStatDunaIn,
  m3uaAspStatDavaIn,
  m3uaAspStatDupuIn

STATUS    current
DESCRIPTION
  "The m3ua group of objects to count how the number of messages received/send by an ASP. Most of these messages applies to the M3UA client process and would also apply to an IPSP acting as a client."

m3uaSgpIpspCfgGroup OBJECT-GROUP

OBJECTS  
  m3uaSgpIpspRtgAsId,
m3uaSgpIpsspRtgRc,
m3uaSgpIpsspAsState,
m3uaSgpIpsspAsTrafficMode,
m3uaSgpIpsspAspState,
m3uaSgpIpsspAspRole,
m3uaSgpIpsspAssocId,
m3uaSgpIpsspAssocMinOutStreams,
m3uaSgpIpsspAssocMaxInStreams
}

STATUS    current
DESCRIPTION
"The m3ua group of objects to describe configuration values
at either the Signaling Gateway Process (SGP) or the IP
Server Process (IPSP)."

::= { m3uaGroups 4 }

m3uaSgpIpsspStatsGroup OBJECT-GROUP
OBJECTS   { m3uaSgpIpsspStatAspupAckOut,
            m3uaSgpIpsspStatAspacAckOut,
            m3uaSgpIpsspStatAspdnAckOut,
            m3uaSgpIpsspStatAspiaAckOut,
            m3uaSgpIpsspStatAspupIn,
            m3uaSgpIpsspStatAspacIn,
            m3uaSgpIpsspStatAspdnIn,
            m3uaSgpIpsspStatAspiaIn,
            m3uaSgpIpsspStatNotifyOut,
            m3uaSgpIpsspStatDunaOut,
            m3uaSgpIpsspStatDavaOut,
            m3uaSgpIpsspStatDupuOut,
            m3uaSgpIpsspStatDaudIn
            }

STATUS    current
DESCRIPTION
"The m3ua group of objects to count how the number of
messages received/send by a Signaling Process or IPSP."

::= { m3uaGroups 5 }

m3uaGenCfgGroup OBJECT-GROUP
OBJECTS   { m3uaGenNaNi,
            m3uaGenNaMtp3ProtType,
            m3uaGenNaMtp3ProtVariant,
            m3uaGenNaMtp3ProtVersion
            }

STATUS    current
DESCRIPTION
"The m3ua group of objects to describe the Network Appearance (NA) value."

::= { m3uaGroups 6 }

m3uaGenStatsGroup OBJECT-GROUP
OBJECTS { m3uaGenStatDataOut,
           m3uaGenStatDataIn,
           m3uaGenStatErrorOut,
           m3uaGenStatErrorIn,
           m3uaGenStatSconOut,
           m3uaGenStatSconIn
        }
STATUS current
DESCRIPTION
"The m3ua group of objects to count how the number of messages received/send by a Signaling Process. This objects are implemented in all kind of signaling processes: ASPs, SGPs and IPSPs."

::= { m3uaGroups 7 }

-- 4.1.2 Compliance Statements

m3uaAspCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement for Application Server Processes (ASP) that implement this MIB in order to be managed using SNMP protocol."

MODULE -- this module
MANDATORY-GROUPS { m3uaAttributesGroup,
                    m3uaAspCfgGroup,
                    m3uaGenCfgGroup,
                    m3uaAspStatsGroup,
                    m3uaGenStatsGroup
                  }

::= { m3uaCompliances 1 }

m3uaSgpCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement for Signaling Gateway Processes (SGP) that implement this MIB in order to be managed using SNMP protocol."

MODULE -- this module
MANDATORY-GROUPS { m3uaAttributesGroup, m3uaSgpIpspCfgGroup, m3uaGenCfgGroup, m3uaSgpIpspStatsGroup, m3uaGenStatsGroup }

::= { m3uaCompliances 2 }

m3uaIpspCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement IP Server Processes (IPSP) that implement this MIB in order to be managed using SNMP protocol."

MODULE -- this module
MANDATORY-GROUPS { m3uaAttributesGroup, m3uaSgpIpspCfgGroup, m3uaGenCfgGroup, m3uaAspStatsGroup, m3uaSgpIpspStatsGroup, m3uaGenStatsGroup }

::= { m3uaCompliances 3 }

END

5. References

5.1 Normative References


5.2 Informative References


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

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6. Security Considerations

SNMPv1 by itself is not a secure environment. Even if security measures are taken (e.g., using IPSEC), there is no per-user control as to who (once an IPSEC association is established between hosts) is allowed to GET or SET the objects in this MIB

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

It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB, is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.
7. Acknowledgements

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9. Revision History

9.1 Changes from draft rev 06 to draft rev 07:

   o References updated.

9.2 Changes from draft rev 05 to draft rev 06:

   o Load-sharing objects (m3uaSpLshMethod, m3uaStreamLshMethod) are removed since nothing is standardized about how to perform load-sharing.

   o Typos.

9.3 Changes from draft rev 04 to draft rev 05:
o Changed objects from having writing permission to read-only

o General MIBs boiler plate updated.

o Tables divided per node type: ASPs, SGP/IPSP and General Tables (with general values and statistic, valid per every node type).

o Updated contact information.

o Removed CIC and SSN from the RK.

o Security Considerations updated.

o Copyright Statement included.

9.4 Changes from draft rev 03 to draft rev 04:

o Integer32 is imported but not used. Removed.

o TEXTUAL-CONVENTION is imported but not used. Removed.

o mib-2 suggested as branch for mib.

o m3uaAppSpEpState consistently defined as INTEGER.

o m3uaPeerAppTrafficMode consistently defined as INTEGER.

o Fixed error in m3uaSpEpEntry object description text.

o Rework in m3uaAppType object description text.

9.5 Changes from draft rev 02 to draft rev 03:

o Value range of m3uaAppTrafficMode object is modified.

o Object m3uaLocalPort is changed to "read-write". A comment is added with the recommended IANA port number.

o Object m3uaFailOverBuffering is deleted. A comment in object m3uaTrValue is added: If Tr is 0 then FailOver Buffering is Off. Thus, there is no further need for this element.

o Object m3uaMaxPeerApplications is deleted.
o Object m3uaMaxSPperApplications is deleted.

o Object m3uaAppType is added to Logical Application Table.

o Replace "Sent" by "out" and "Received" by "in" in statistics.

o Object m3uaSSN is deleted from Routing Table.

o Object m3uaNI is deleted from Routing Table.

o Object m3uaPeerAppTrafficMode is added to Routing Table.

o Index m3uaAppId in SP Endpoint Statistic Table is removed.

o Signaling Process Table replaced by Application-Endpoint Table.

o Index m3uaSpEpAssocId in SP Endpoint Table is removed.

o Index m3uaSpEpassocId in Local and Remote IP address table is replaced by m3uaSpEpId.

o Added new Lookup Reverse Tables for:
  - Get EndPoint Id from Association Id.
  - Get Routing Key Id from Application Id.
  - Get Routing Key Id from DPC and NA.
  - Get Endpoints serving an Application.

o Routing Table has been restructured to deal with multiplicity of SIs, OPCs and CIC Ranges per Routing Key.
  Three new subtables are used.

9.6 Changes from draft rev 01 to draft rev 02:

o Section 3.1.2.3 Signaling Process Table - Chapter re-phrased.

o Section 3.1.2.4 Signaling Process Endpoint Table - Last paragraph removed.

o Section 3.1.2.5 Signaling Process Endpoint Statistics Table
  m3uaAppId and m3uaSpEpId added to the table figure
  Corresponding changes in Definitions chapter applied.

o Section 3.1.2.6 Network Appearance Table
  Fixed Duplicate Section No.
  m3uaNaRowStatus added to table figure.
  Corresponding changes in Definitions chapter applied.
o Object definition of m3uaMaxStreamInbound is removed.

o Object Definition of m3uaSpEpEntry
   Index "m3uaAppId" is replaced by m3uaSpEpAssocId.

o Object Definition of m3uaSpEpStatRowStatus
   Definition is deleted.

9.7 Changes due to the alignment with the RFC2851 update.

o Include clarification text of the IP address types supported in
  the M3UA MIB. Chapter 3.1.2.7.2 (Local and Remote IP address table)

o Remote Primary IP address: Addition of the ipv4z an ipv6z types for
  non-globally IP addresses in which a scope identifier is needed.
  Addition of the scope of ipv6 type. All of them according to the
  RFC2851update-v04

o InetAddressType for local and remote IP addresses:

  Limit UNKNOWN type only for unknown IP address format. Remove UNKNOWN
  type for zero-length value in the InetAddress since it will be never
  zero-length due to the size restriction (0..64)

  Addition of the ipv4z an ipv6z types for non-globally IP addresses in
  which a scope identifier is needed. Addition of the scope of ipv6
  type.
  All of them according to the RFC2851update-v04

o Conformance:

  Description: Specify that the M3UA MIB only need to support IPv4/IPv6
  addresses without a zone index, unknown type and DNS names. Support
  for
  IPv4/IPv6 addresses without zone indices is not required.

  InetAddressType of local and remote IP address: Clarify the
  implementation is only required to support IPv4 and IPv6 address types
  without zone indices. Clarify also that UNKNOWN type is only used in
  case of local and remote addresses when invalid/unknown IP address
  format.