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Definitions of Managed Objects for Multicast over UNI 3.0/3.1 based ATM Networks

Status of this Memo

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

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IANA Note

Due to a clerical error in the assignment of the snmpModules in this memo, this RFC provides the corrected number assignment for this protocol. This memo obsoletes RFC 2366.

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 IP hosts and routers that use a Multicast Address Resolution Server (MARS) to support IP multicast over ATM, as described in 'Support for Multicast over UNI 3.0/3.1 based ATM Networks' [1].

This memo specifies a MIB module in a manner that is both compliant to the SNMPv2 SMI, and semantically identical to the peer SNMPv1 definitions.

Table of Contents

1. The SNMP Network Management Framework

The SNMP Network Management Framework presently consists of these components. They are:

- the SMI, described in RFC 1902 [2] - the mechanisms used for describing and naming objects for the purpose of management.
- the Textual Conventions, described in RFC 1903 [3] for SNMPv2.
- the Conformance Statements, described in RFC 1904 [4] for SNMPv2.
- the Simple Network Management Protocol, described in STD 15, RFC 1157 [5].
- the Protocol Operations, described in RFC 1905 [6] for SNMPv2.
- the MIB-II, STD 17, RFC 1213 [7] - the core set of managed objects for the Internet suite of protocols for SNMPv2.

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

1.1. Object Definitions

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object

type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to also refer to the object type.

2. Overview

This MARS MIB is designed to define managed objects that can be used to manage the MARS clients, servers, and the multicast servers (MCS), as described in the RFC2022[1]. The MIB is supposed to be used on a system where one or more MARS clients are running, or where one or more MARS servers are running, or where one or more MARS multicast servers are running.

An understanding of MARS, as defined in [1] is assumed in this MIB module definition. However, the following terms are used frequently and are included here for reference:

Multicast Group

A group of endpoints that communicate with each other such that packets sent from one endpoint are received by all other members of the multicast group.

Multicast Address Resolution Server (MARS)

A server that distributes multicast group membership information to endpoints.

Client/Endpoint

An ATM-attached host or router that registers with a MARS and that is a member of one or more multicast groups. An endpoint may establish ATM Virtual Channels (VCs) to the other group members or may make use of a Multicast Server.

Cluster

The set of clients managed by a MARS.

Multicast Server (MCS)

A server that sets up ATM Virtual Channels (VCs) between endpoints in a multicast group and to which the endpoints forward data traffic for transmission on their behalf.

The MIB is broken down into three major groups: a MARS client group, MARS (server) group, and MARS Multicast Server (MCS) Group.

2.1. The MARS Client Group

This client group defines a collection of objects required to be implemented in a MIB for the management of MARS clients. It contains the following tables:

o MARS Client Table

Information about a client such as its ATM address, the ATM address of its default MARS, registration status, and timers.

o MARS Client Multicast Group Table

A list of IP multicast address blocks associated with a MARS client.

o MARS Client Backup MARS Group Table

A list of backup MARS's associated with a MARS client.

o MARS Client VC Table

Information about VCs opened by a client.

o MARS Client Statistics Table

Statistics collected by a MARS client.

2.2. The MARS Server Group

This MARS server group defines a collection of objects required to be implemented in a MIB for the management of MARS servers. It contains the following tables:

o MARS Table

Information about a MARS such as its ATM address, its status and timers.

o MARS Multicast Group Table

A list of IP multicast address blocks associated with a MARS.

o MARS VC Table

Information about VCs opened by a MARS.

o MARS Registered Client Table

A list of clients registered with a MARS.

o MARS Registered Multicast Server Table

A list of MCSs registered with a MARS.

o MARS Statistics Table

Statistics collected by a MARS.

o MARS Host Map Table

Mappings between multicast groups and clients maintained by a MARS.

o MARS Server Map Table

Mappings between multicast groups and MCSs maintained by a MARS.

2.3. The MARS Multicast Server Group

This MARS multicast server group defines a collection of objects required to be implemented in a MIB for the management of MARS multicast servers. It contains the following tables:

This group contains the following tables:

o MARS Multicast Server Table

Information about a MCS, such as its ATM address, default MARS ATM address, and registration state.

o MARS MCS Multicast Group Table

A list of IP multicast address blocks associated with a MARS MCS.

o MARS MCS Backup Mars Group Table

A list of backup MARS's associated with a MARS MCS.

o MARS Multicast Server VC Table

Information about VCs opened by a MCS.

o MARS Multicast Server Statistics Table

Statistics collected by a MCS.

3. IP Over ATM Multicast Address Resolution Server MIB Definitions

```
   IPATM-IPMC-MIB DEFINITIONS ::= BEGIN

   IMPORTS
       MODULE-COMPLIANCE, NOTIFICATION-GROUP, OBJECT-GROUP
           FROM SNMPv2-CONF
       snmpModules, MODULE-IDENTITY, NOTIFICATION-TYPE, Counter32,
           Integer32, Unsigned32, OBJECT-TYPE, IpAddress
           FROM SNMPv2-SMI
       AtmAddr
           FROM ATM-TC-MIB
       TruthValue, RowStatus
           FROM SNMPv2-TC
       ipAdEntAddr
           FROM RFC1213-MIB
       InterfaceIndex
           FROM IF-MIB;

      marsMIB MODULE-IDENTITY
          LAST-UPDATED "9809010000Z" -- 01 September 1998
          ORGANIZATION "Internetworking Over NBMA (ion) Working Group"
          CONTACT-INFO
              "        Chris Chung (chihschung@aol.com)
                       Independent Consultant

               Editor: Maria Greene
               Postal: Independent Contractor
               E-mail: maria@xedia.com
              "
          DESCRIPTION
              "This module defines a portion of the managed information
               base (MIB) for managing classical IP multicast address
               resolution server (MARS) and related entities as
               described in the RFC2022.  This MIB is meant to be
               used in conjunction with the ATM-MIB (RFC1695),
               MIB-II (RFC1213), and optionally the IF-MIB (RFC1573).
              "
          REVISION     "9809010000Z" -- 01 September 1998
          DESCRIPTION  "Published as RFC 2417. Changes/fixes:
                        - reroot this MIB from snmpModules to mib-2
                          to be consistent with location of other MIBs.
                        - obsoletes RFC2366."
          REVISION     "9804150145Z" -- 15 April 1998
          DESCRIPTION  "Initial version, published as RFC 2366"
          ::= { mib-2 57 }

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

```
   --  IP ATM MARS Client Object Definitions
   --*****************************************************************

   marsClientObjects  OBJECT IDENTIFIER ::= { marsMIB 1 }

   marsClientTable OBJECT-TYPE
       SYNTAX  SEQUENCE OF MarsClientEntry
       MAX-ACCESS  not-accessible
       STATUS current
       DESCRIPTION
           "The objects defined in this table are used for
            the management of MARS clients, ATM attached
            endpoints."
       ::= { marsClientObjects 1 }

   marsClientEntry OBJECT-TYPE
       SYNTAX  MarsClientEntry
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Each entry contains a MARS client and its associated
            attributes.  An entry in the marsClientTable has
            a corresponding entry in the ipAddrTable defined in
            RFC1213. Association between the ipAddrTable and
            the marsClientTable is made through the index,
            ipAdEntAddr."
       INDEX { ipAdEntAddr, marsClientIndex }
       ::= { marsClientTable 1 }

   MarsClientEntry ::=
       SEQUENCE {
           marsClientIndex                   Integer32,
           marsClientAddr                    AtmAddr,
           marsClientDefaultMarsAddr         AtmAddr,
           marsClientHsn                     Unsigned32,
           marsClientRegistration            INTEGER,
           marsClientCmi                     INTEGER,
           marsClientDefaultMtu              INTEGER,
           marsClientFailureTimer            INTEGER,
           marsClientRetranDelayTimer        INTEGER,
           marsClientRdmMulReqAddRetrTimer   INTEGER,
           marsClientRdmVcRevalidateTimer    INTEGER,
           marsClientJoinLeaveRetrInterval   INTEGER,
           marsClientJoinLeaveRetrLimit      INTEGER,
           marsClientRegWithMarsRdmTimer     INTEGER,
           marsClientForceWaitTimer          INTEGER,
           marsClientLmtToMissRedirMapTimer  INTEGER,
           marsClientIdleTimer               INTEGER,
```

```
          marsClientRowStatus                RowStatus
      }

   marsClientIndex OBJECT-TYPE
       SYNTAX  Integer32(1..65535)
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "The auxiliary variable used to identify instances of
            the columnar objects in the MARS MarsClientTable."
       ::= { marsClientEntry 1 }

   marsClientAddr OBJECT-TYPE
       SYNTAX  AtmAddr
          MAX-ACCESS read-create
          STATUS  current
          DESCRIPTION
              "The ATM address associated with the ATM Client."
          ::= { marsClientEntry 2 }

   marsClientDefaultMarsAddr OBJECT-TYPE
       SYNTAX  AtmAddr
          MAX-ACCESS read-create
          STATUS  current
          DESCRIPTION
              "The default MARS ATM address which is needed to
               setup the initial signalling path between a MARS
               client and its associated MARS."
          ::= { marsClientEntry 3 }

   marsClientHsn OBJECT-TYPE
       SYNTAX  Unsigned32
       MAX-ACCESS read-create
          STATUS  current
          DESCRIPTION
              "The cluster membership own 32 bit Host Sequence
               Number.  When a new cluster member starts up, it is
               initialized to zero.  When the cluster member sends
               the MARS_JOIN to register, the HSN will be correctly
               set to the current cluster sequence number (CSN) when
               the Client receives the copy of its MARS_JOIN from
               the MARS.  It is is used to track the MARS sequence
               number."
          ::= { marsClientEntry 4 }

   marsClientRegistration OBJECT-TYPE
       SYNTAX  INTEGER {
             notRegistered (1),
```

```
            registering (2),
            registered (3),
            reRegisteringFault (4),
            reRegisteringRedirMap (5)
          }
      MAX-ACCESS read-create
      STATUS  current
      DESCRIPTION
          "An indication with regards to the registration
           status of this client. The registration codes
           of 'notRegistered (1)', 'registered (2)', and
           registered (3) are self-explanatory. The
           'reRegisteringFault (4)' indicates the client is
           in the process of re-registering with a MARS due
           to some fault conditions.  The 'reRegisteringRedMap
           (5)' status code shows that client is re-registering
           because it has received a MARS_REDIRECT_MAP message
           and was told to register with a different MARS from
           the current MARS."
      ::= { marsClientEntry 5 }

  marsClientCmi OBJECT-TYPE
      SYNTAX  INTEGER (0..65535)
      MAX-ACCESS read-create
      STATUS  current
      DESCRIPTION
          "16 bit Cluster member identifier (CMI) assigned by the
           MARS which uniquely identifies each endpoint attached
           to the cluster.  The value becomes valid after the
           'marsClientRegistration' is set to the value
           of 'registered (1)'."
      ::= { marsClientEntry 6 }

  marsClientDefaultMtu OBJECT-TYPE
      SYNTAX  INTEGER (1..65535)
      MAX-ACCESS read-create
      STATUS  current
      DESCRIPTION
          "The default maximum transmission unit (MTU) used for
           this cluster.  Note that the actual size used for a
           VC between two members of the cluster may be negotiated
           during connection setup and may be different than this
           value.  Default value = 9180 bytes."
      DEFVAL { 9180 }
      ::= { marsClientEntry 7 }

  marsClientFailureTimer OBJECT-TYPE
      SYNTAX  INTEGER (1..2147483647)
```

```
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "A timer used to flag the failure of last MARS_MULTI
             to arrive.  Default value = 10 seconds (recommended)."
        DEFVAL { 10 }
        ::= { marsClientEntry 8 }

    marsClientRetranDelayTimer OBJECT-TYPE
        SYNTAX  INTEGER (5..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The delay timer for sending out new MARS_REQUEST
             for the group after the client learned that there
             is no other group in the cluster.  The timer must
             be set between 5 and 10 seconds inclusive."
        ::= { marsClientEntry 9 }

    marsClientRdmMulReqAddRetrTimer OBJECT-TYPE
        SYNTAX  INTEGER (5..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The initial random L_MULTI_RQ/ADD retransmit timer
             which can be set between 5 and 10 seconds inclusive."
        ::= { marsClientEntry 10 }

    marsClientRdmVcRevalidateTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The random time to set VC_revalidate flag.  The
             timer value ranges between 1 and 10 seconds
             inclusive."
        ::= { marsClientEntry 11 }

    marsClientJoinLeaveRetrInterval OBJECT-TYPE
        SYNTAX  INTEGER(5..2147483647)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
```

```
            "MARS_JOIN/LEAVE retransmit interval. The minimum
             and recommended values are 5 and 10 seconds,
             respectively."
        DEFVAL { 10 }
        ::= { marsClientEntry 12 }

    marsClientJoinLeaveRetrLimit OBJECT-TYPE
        SYNTAX  INTEGER (0..5)
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "MARS_JOIN/LEAVE retransmit limit. The maximum
             value is 5."
        ::= { marsClientEntry 13 }

    marsClientRegWithMarsRdmTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Random time to register with MARS."
        ::= { marsClientEntry 14 }

    marsClientForceWaitTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "minutes"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Force wait if MARS re-registration is looping.
             The minimum value is 1 minute."
        ::= { marsClientEntry 15 }

    marsClientLmtToMissRedirMapTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..4)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Timer limit for client to miss MARS_REDIRECT_MAPS."
        ::= { marsClientEntry 16 }

    marsClientIdleTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "minutes"
        MAX-ACCESS read-create
        STATUS  current
```

```
        DESCRIPTION


            "The configurable inactivity timer associated with a
             client. When a VC is created at this client, it gets
             the idle timer value from this configurable timer.
             The minimum suggested value is 1 minute and the
             recommended default value is 20 minutes."
        DEFVAL { 20 }
        ::= { marsClientEntry 17 }

    marsClientRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create, delete or modify a
             row in this table.

             A row cannot be made 'active' until instances of
             all corresponding columns in the row of this table
             are appropriately configured and until the agent
             has also created a corresponding row in the
             marsClientStatTable.

             When this object has a value of 'active', the
             following columnar objects can not be modified:

               marsClientDefaultMarsAddr,
               marsClientHsn,
               marsClientRegstration,
               marsClientCmi,
               marsClientDefaultMtu

             while other objects in this conceptual row can be
             modified irrespective of the value of this object.

             Deletion of this row is allowed regardless of
             whether or not a row in any associated tables
             (i.e., marsClientVcTable) still exists or is in
             use. Once this row is deleted, it is recommended
             that the agent or the SNMP management station
             (if possible) through the set command deletes
             any stale rows that are associated with this
             row."
        ::= { marsClientEntry 18 }

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

```
   -- IP ATM MARS Client Multicast Group Address Object Definitions
   --*****************************************************************

   marsClientMcGrpTable OBJECT-TYPE
       SYNTAX  SEQUENCE OF MarsClientMcGrpEntry
       MAX-ACCESS not-accessible
       STATUS current
       DESCRIPTION
           "This table contains a list of IP multicast group address
            blocks associated with a MARS client.  Entries in this
            table are used by the client that needs to receive or
            transmit packets from/to the specified range of
            multicast addresses.
            Each row can be created or deleted via configuration."
       ::= {  marsClientObjects 2 }

   marsClientMcGrpEntry OBJECT-TYPE
       SYNTAX  MarsClientMcGrpEntry
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Each entry represents a consecutive block of multicast
            group addresses."
       INDEX { ipAdEntAddr,
               marsClientIndex,
               marsClientMcMinGrpAddr,
               marsClientMcMaxGrpAddr }
       ::= { marsClientMcGrpTable 1 }

   MarsClientMcGrpEntry ::=
       SEQUENCE {
           marsClientMcMinGrpAddr           IpAddress,
           marsClientMcMaxGrpAddr           IpAddress,
           marsClientMcGrpRowStatus         RowStatus
       }

   marsClientMcMinGrpAddr OBJECT-TYPE
       SYNTAX  IpAddress
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Minimum multicast group address - the min and max
            multicast forms multi-group block.  If the MinGrpAddr
            and MaxGrpAddr are the same, it indicates that this
            block contains a single group address."
       ::= { marsClientMcGrpEntry 1 }

   marsClientMcMaxGrpAddr OBJECT-TYPE
```

```
        SYNTAX  IpAddress
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Maximum multicast group address - the min and max
             multicast forms a multi-group block.  If the MinGrpAddr
             and MaxGrpAddr are the same, it indicates that this
             block contains a single group address."
        ::= { marsClientMcGrpEntry 2 }

    marsClientMcGrpRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create or delete a row in this
             table.

             Since other objects in this row are not-accessible
             'index-objects', the value of this object has no
             effect on whether those objects in this conceptual
             row can be modified."
        ::= { marsClientMcGrpEntry 3 }

    --****************************************************************
    -- IP ATM MARS Client Backup MARS Object Definitions
    --****************************************************************

    marsClientBackupMarsTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsClientBackupMarsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains a list of backup MARS addresses that
             a client can connect to in case of failure for connecting
             to the primary server. The list of addresses is in
             descending order of preference. It should be noted that
             the backup list provided by the MARS to the client via
             the MARS_REDIRECT_MAP message has a higher preference than
             addresses that are manually configured into the client.
             When such a list is received from the MARS, this information
             should be inserted at the top of the list.
             Each row can be created or deleted via configuration."
        ::= {  marsClientObjects 3 }

    marsClientBackupMarsEntry OBJECT-TYPE
        SYNTAX  MarsClientBackupMarsEntry
        MAX-ACCESS not-accessible
```

```
        STATUS  current
        DESCRIPTION
            "Each entry represents an ATM address of a backup MARS."
        INDEX { ipAdEntAddr,
                marsClientIndex,
                marsClientBackupMarsPriority,
                marsClientBackupMarsAddr }
        ::= { marsClientBackupMarsTable 1 }

    MarsClientBackupMarsEntry ::=
        SEQUENCE {
            marsClientBackupMarsPriority     Unsigned32,
            marsClientBackupMarsAddr         AtmAddr,
            marsClientBackupMarsRowStatus    RowStatus
        }

    marsClientBackupMarsPriority OBJECT-TYPE
        SYNTAX  Unsigned32(0..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The priority associated with a backup MARS. A lower
             priority value inidcates a higher preference."
        ::= { marsClientBackupMarsEntry 1 }

    marsClientBackupMarsAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The ATM address associated with a backup MARS."
        ::= { marsClientBackupMarsEntry 2 }

    marsClientBackupMarsRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create or delete a row in this
             table.

             Since other objects in this row are not-accessible
             'index-objects', the value of this object has no effect
             on whether those objects in this conceptual row can be
             modified."
        ::= { marsClientBackupMarsEntry 3 }

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

```
   --  IP ATM MARS Client VC Object Definition Table
   --*****************************************************************

   marsClientVcTable OBJECT-TYPE
       SYNTAX  SEQUENCE OF MarsClientVcEntry
       MAX-ACCESS  not-accessible
       STATUS current
       DESCRIPTION
           "This table contains information about open virtual
            circuits (VCs) that a client has.  For point to point
            circuit, each entry represents a single VC connection
            between this client ATM address to another party ATM
            address.  In the case of point to multipoint connection
            where a single source address is associated with
            multiple destinations, several entries are used to
            represent the relationship.  An example of point to
            multi-point VC represented in a table is shown below.

                   Client    VPI/VCI    Grp Addr1/Addr2    Part Addr
                     1         0,1          g1,g2             p1
                     1         0,1          g1,g2             p2
                     1         0,1          g1,g2             p3

            Note:  This table assumes the IP multicast address
                   groups (min, max) defined in each entry are
                   always consecutive.  In the case of that a
                   client receives a JOIN/LEAVE with
                   mars$flag.punched set, each pair of the IP
                   groups will first be broken into several
                   pairs of consecutive IP groups before each
                   entry row corresponding to a pair of IP group
                   is created."
       ::= { marsClientObjects 4 }

   marsClientVcEntry OBJECT-TYPE
       SYNTAX  MarsClientVcEntry
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "The objects contained in the entry are VC related
            attributes such as VC signalling type, control VC
            type, idle timer, negotiated MTU size, etc."
       INDEX { ipAdEntAddr,
               marsClientIndex,
               marsClientVcVpi,
               marsClientVcVci,
               marsClientVcMinGrpAddr,
               marsClientVcMaxGrpAddr,
```

```
                marsClientVcPartyAddr }
        ::= { marsClientVcTable 1 }

    MarsClientVcEntry ::=
        SEQUENCE {
            marsClientVcVpi            INTEGER,
            marsClientVcVci            INTEGER,
            marsClientVcMinGrpAddr     IpAddress,
            marsClientVcMaxGrpAddr     IpAddress,
            marsClientVcPartyAddr      AtmAddr,
            marsClientVcPartyAddrType  INTEGER,
            marsClientVcType           INTEGER,
            marsClientVcCtrlType       INTEGER,
            marsClientVcIdleTimer      INTEGER,
            marsClientVcRevalidate     TruthValue,
            marsClientVcEncapsType     INTEGER,
            marsClientVcNegotiatedMtu  INTEGER,
            marsClientVcRowStatus      RowStatus
        }

    marsClientVcVpi OBJECT-TYPE
        SYNTAX  INTEGER (0..4095)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The value of virtual path identifier (VPI). Since
             a VPI can be numbered 0, this sub-index can take
             a value of 0."
        ::= { marsClientVcEntry 1 }

    marsClientVcVci OBJECT-TYPE
        SYNTAX  INTEGER (0..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The value of virtual circuit identifier (VCI). Since
             a VCI can be numbered 0, this sub-index can take
             a value of 0."
        ::= { marsClientVcEntry 2 }

    marsClientVcMinGrpAddr OBJECT-TYPE
        SYNTAX  IpAddress
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Minimum IP multicast group address - the min and
             max multicast forms a multi-group consecutive
             block which is associated with a table entry.
```

```
            if the MinGrpAddr and MaxGrpAddr are the same, it
            indicates that the size of multi-group block is 1,
            a single IP group."
        ::= { marsClientVcEntry 3 }

    marsClientVcMaxGrpAddr OBJECT-TYPE
        SYNTAX  IpAddress


        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Maximum IP multicast group address - the min and
             max multicast forms a multi-group consecutive
             block which is associated with a table entry.
             if the MinGrpAddr and MaxGrpAddr are the same, it
             indicates that the size of multi-group block is 1,
             a single IP group."
        ::= { marsClientVcEntry 4 }

    marsClientVcPartyAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "An ATM party address in which this VC is linked.
             The party type is identified by the
             marsClientVcPartyAddrType."
        ::= { marsClientVcEntry 5 }

    marsClientVcPartyAddrType OBJECT-TYPE
        SYNTAX  INTEGER {
              called (1),
              calling (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The party type is associated with the party address.
             The 'called (1)' indicates that the party address is
             a destination address which implies that VC is
             originated from this client.  The 'calling (2)'
             indicates the VC was initiated externally to this
             client. In this case, the party address is the
             source address."
        ::= { marsClientVcEntry 6 }

    marsClientVcType OBJECT-TYPE
```

```
        SYNTAX  INTEGER {
              pvc (1),
              svc (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Circuit Connection type: permanent virtual circuit or
             switched virtual circuit."
        ::= { marsClientVcEntry 7 }

    marsClientVcCtrlType OBJECT-TYPE
        SYNTAX  INTEGER {
               pointToPointVC (1),
               clusterControlVC (2),
               pointToMultiPointVC (3)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Control VC type used to specify a particular connection.
               pointToPointVC (1):
                 used by the ATM Clients for the registration and
                 queries.  This VC or the initial signalling path
                 is set up from the source Client to a MARS. It is
                 bi-directional.
               clusterControlVC (2):
                 used by a MARS to issue asynchronous updates to an
                 ATM Client.  This VC is established from the MARS
                 to the ATM Client.
               pointToMultiPointVC (3):
                 used by the client to transfer multicast data
                 packets from layer 3.  This VC is established
                 from the source ATM Client to a destination ATM
                 endpoint which can be a multicast group member
                 or an MCS.  The destination endpoint was obtained
                 from the MARS."
        ::= { marsClientVcEntry 8 }

    marsClientVcIdleTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "minutes"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The idle timer associated with this VC.  The minimum
             suggested value is 1 minute and the recommended
             default value is 20 minutes."
```

```
        DEFVAL { 20 }
        ::= { marsClientVcEntry 9 }

    marsClientVcRevalidate OBJECT-TYPE
        SYNTAX  TruthValue
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "A flag associated with an open and active multipoint
             VC.  It is checked every time a packet is queued for
             transmission on that VC. The object has the value of
             true (1) if revalidate is required and the value
             false (2) otherwise."
        ::= { marsClientVcEntry 10 }

     marsClientVcEncapsType OBJECT-TYPE
        SYNTAX  INTEGER {
              other (1),
              llcSnap (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The encapsulation type used when communicating over
             this VC."
        ::= { marsClientVcEntry 11 }

    marsClientVcNegotiatedMtu OBJECT-TYPE
        SYNTAX  INTEGER (1..65535)
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The negotiated MTU when communicating over this VC."
        ::= { marsClientVcEntry 12 }

    marsClientVcRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create, delete or modify a
             row in this table.

             A row cannot be made 'active' until instances of
             all corresponding columns in the row of this table
             are appropriately configured.

             While objects: marsClientVcIdleTimer and
```

```
            marsClientVcRevalidate in this conceptual
            row can be modified irrespective of the value
            of this object, all other objects in the row can
            not be modified when this object has a value
            of 'active'.

            It is possible for an SNMP management station
            to set the row to 'notInService' and modify
            the entry and then set it back to 'active'

            with the following exception. That is, rows
            for which the corresponding instance of
            marsClientVcType has a value of 'svc' can not
            be modified or deleted."
        ::= { marsClientVcEntry 13 }

    --****************************************************************
    --  IP ATM MARS Client Statistic Object Definition Table
    --****************************************************************

    marsClientStatTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsClientStatEntry
        MAX-ACCESS  not-accessible
        STATUS current
        DESCRIPTION
            "The table contains statistics collected at MARS
             clients."
        ::= { marsClientObjects 5 }

    marsClientStatEntry OBJECT-TYPE
        SYNTAX  MarsClientStatEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry contains statistics collected at one MARS
             client."
        INDEX { ipAdEntAddr, marsClientIndex }
        ::= { marsClientStatTable 1 }

    MarsClientStatEntry ::=
        SEQUENCE {
            marsClientStatTxReqMsgs        Counter32,
            marsClientStatTxJoinMsgs       Counter32,
            marsClientStatTxLeaveMsgs      Counter32,
            marsClientStatTxGrpLstReqMsgs  Counter32,
            marsClientStatRxJoinMsgs       Counter32,
            marsClientStatRxLeaveMsgs      Counter32,
            marsClientStatRxMultiMsgs      Counter32,
```

```
            marsClientStatRxNakMsgs        Counter32,
            marsClientStatRxMigrateMsgs    Counter32,
            marsClientStatRxGrpLstRplyMsgs Counter32,
            marsClientStatFailMultiMsgs    Counter32
        }

    marsClientStatTxReqMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_REQUEST messages transmitted
             from a client."
        ::= { marsClientStatEntry 1 }

    marsClientStatTxJoinMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_JOIN messages transmitted from
             a client."
        ::= { marsClientStatEntry 2 }

    marsClientStatTxLeaveMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_LEAVE messages transmitted from
             a client."
        ::= { marsClientStatEntry 3 }

    marsClientStatTxGrpLstReqMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_GROUPLIST_REQUEST messages
             transmitted from a client."
        ::= { marsClientStatEntry 4 }

    marsClientStatRxJoinMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_JOIN messages received by
```

```
            a client."
        ::= { marsClientStatEntry 5 }

    marsClientStatRxLeaveMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_LEAVE messages received by
             a client."
        ::= { marsClientStatEntry 6 }

    marsClientStatRxMultiMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MULTI messages received by
             a client."
        ::= { marsClientStatEntry 7 }

    marsClientStatRxNakMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_NAK messages received by
             a client."
        ::= { marsClientStatEntry 8 }

    marsClientStatRxMigrateMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MIGRATE messages received by
             a client."
        ::= { marsClientStatEntry 9 }

        marsClientStatRxGrpLstRplyMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_GROUPLIST_REPLY messages
             received by a client."
        ::= { marsClientStatEntry 10 }
```

```
   marsClientStatFailMultiMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of timeouts occurred indicating
            failure of the last MARS_MULTI to arrive."
       ::= { marsClientStatEntry 11 }

   --*****************************************************************
   --  IP ATM MARS Object Definitions
   --*****************************************************************

   marsObjects    OBJECT IDENTIFIER ::= { marsMIB 2 }

   marsTable OBJECT-TYPE
       SYNTAX  SEQUENCE OF MarsEntry
       MAX-ACCESS  not-accessible
       STATUS current
       DESCRIPTION
           "The objects defined in this table are used for the
            management of MARS servers."
       ::= {  marsObjects 1 }

   marsEntry OBJECT-TYPE
       SYNTAX  MarsEntry
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Each entry contains a MARS and its associated
            attributes."
       INDEX { marsIndex, marsIfIndex }
       ::= { marsTable 1 }

   MarsEntry ::=
       SEQUENCE {
           marsIndex              Integer32,
           marsIfIndex            InterfaceIndex,
           marsAddr               AtmAddr,
           marsLocal              TruthValue,
           marsServStatus         INTEGER,
           marsServType           INTEGER,
           marsServPriority       Unsigned32,
           marsRedirMapMsgTimer   INTEGER,
           marsCsn                Unsigned32,
           marsSsn                Unsigned32,
           marsRowStatus          RowStatus
       }
```

```
   marsIndex OBJECT-TYPE
       SYNTAX  Integer32(1..65535)
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "The auxiliary variable used to identify instances of
            the columnar objects in the MARS table."
       ::= { marsEntry 1 }

   marsIfIndex OBJECT-TYPE
       SYNTAX  InterfaceIndex
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "The ifIndex of the interface that the MARS is
            associated with."
       ::= { marsEntry 2 }

   marsAddr OBJECT-TYPE
       SYNTAX  AtmAddr
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "The ATM address associated with the MARS."
       ::= { marsEntry 3 }

   marsLocal OBJECT-TYPE
       SYNTAX  TruthValue
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "A flag associated with a MARS entry.  The object has
            the value of true (1) if the MARS whose interface
            is local to the machine that implements this MIB;
            otherwise the object has the value of false (2)."
       ::= { marsEntry 4 }

   marsServStatus OBJECT-TYPE
       SYNTAX  INTEGER {
             active (1),
             inactive (2),
             faulted (3)
           }
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "The current status of MARS."
       ::= { marsEntry 5 }
```

```
   marsServType OBJECT-TYPE
       SYNTAX  INTEGER {
             primary (1),
             backup (2)
           }
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "Types of MARS servers: primary or backup."
       ::= { marsEntry 6 }

   marsServPriority OBJECT-TYPE
       SYNTAX  Unsigned32(0..65535)
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "Priority associated with a backup MARS server.
            A backup MARS server with lower priority value
            indicates a higher preference than other backup
            MARS servers to be used as the MARS server when
            the primary server fails."
       ::= { marsEntry 7 }

   marsRedirMapMsgTimer OBJECT-TYPE
       SYNTAX  INTEGER (1..2)
       UNITS   "minutes"
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "Periodic interval on which a multi-part
            MARS_REDIRECT_MAP is sent from this MARS."
          DEFVAL { 1 }
       ::= { marsEntry 8 }

   marsCsn OBJECT-TYPE
       SYNTAX  Unsigned32
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "Current cluster sequence number (CSN) which is global
            within the context of a given protocol.  The CSN is
            incremented by the MARS on every transmission of a
            message on ClusterControlVC.  A cluster member uses
            the CSN to track the message loss on ClusterControlVC
            or to monitor a membership change."
       ::= { marsEntry 9 }

   marsSsn OBJECT-TYPE
```

```
      SYNTAX  Unsigned32
      MAX-ACCESS read-create
      STATUS  current
      DESCRIPTION
          "Current server sequence number (SSN) which is global
           within the context of a given protocol.  The SSN is
           incremented by the MARS on every transmission of a
           message on ServerControlVC.  A MCS uses the SSN to
           track the message loss on ServerControlVC or to
           monitor a membership change."
      ::= { marsEntry 10 }

  marsRowStatus OBJECT-TYPE
      SYNTAX  RowStatus
      MAX-ACCESS read-create
      STATUS  current
      DESCRIPTION
          "The object is used to create, delete or modify a
           row in this table.

           A row cannot be made 'active' until instances of
           all corresponding columns in the row of this table
           are appropriately configured and until the agent
           has also created a corresponding row in the
           marsStatTable.

           When this object has a value of 'active', the
           following columnar objects can not be modified:

             marsAddr,
             marsAddrLocal,
             marsServStatus,
             marsServType,
             marsCsn,
             marsSsn

           while other objects in this conceptual row can be
           modified irrespective of the value of this object.

           Deletion of this row is allowed regardless of
           whether or not a row in any associated tables
           (i.e., marsVcTable) still exists or is in use.
           Once this row is deleted, it is recommended that
           the agent or the SNMP management station (if
           possible) through the set command deletes any
           stale rows that are associated with this row."
      ::= { marsEntry 11 }
```

```
--*****************************************************************
-- IP ATM MARS Multicast Group Address Object Definitions
--*****************************************************************

marsMcGrpTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF MarsMcGrpEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table contains a list of IP multicast address
         blocks associated with a MARS.  Entries in this table
         are used by the MARS host map table and the server map
         table.  They should be created prior to being referenced
         as indices by those tables.
         Each row can be created or deleted via configuration."
    ::= { marsObjects 2 }

marsMcGrpEntry OBJECT-TYPE
    SYNTAX  MarsMcGrpEntry
    MAX-ACCESS not-accessible
    STATUS  current
    DESCRIPTION
        "Each entry represents a consecutive block of multicast
         group addresses."
    INDEX { marsIndex,
            marsIfIndex,
            marsMcMinGrpAddr,
            marsMcMaxGrpAddr }
    ::= { marsMcGrpTable 1 }

MarsMcGrpEntry ::=
    SEQUENCE {
        marsMcMinGrpAddr           IpAddress,
        marsMcMaxGrpAddr           IpAddress,
        marsMcGrpAddrUsage         INTEGER,
        marsMcGrpRxLayer3GrpSets   Counter32,
        marsMcGrpRxLayer3GrpResets Counter32,
        marsMcGrpRowStatus         RowStatus
    }

marsMcMinGrpAddr OBJECT-TYPE
    SYNTAX  IpAddress
    MAX-ACCESS not-accessible
    STATUS  current
    DESCRIPTION
        "Minimum multicast group address - the min and max
         multicast forms multi-group block.  If the MinGrpAddr
         and MaxGrpAddr are the same, it indicates that this
```

```
            block contains a single group address."
        ::= { marsMcGrpEntry 1 }

    marsMcMaxGrpAddr OBJECT-TYPE
        SYNTAX  IpAddress
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Maximum multicast group address - the min and max
             multicast forms a multi-group block.  If The
             MinGrpAddr and MaxGrpAddr are the same, it indicates
             that this block contains a single group address."
        ::= { marsMcGrpEntry 2 }

    marsMcGrpAddrUsage OBJECT-TYPE
        SYNTAX  INTEGER {
              hostMap (1),
              serverMap (2),
              hostServerMap (3)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Usage of the multicast address block.  The hostMap (1)
             indicates that the address block is only used in the
             MARS host map table. The serverMap (2) indicates
             that the address block is only used in the MARS
             server map table.  The hostServerMap (3) indicates
             that the address block is used in both the host map
             and the server map tables."
        ::= { marsMcGrpEntry 3 }

    marsMcGrpRxLayer3GrpSets OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Number of MARS_JOIN messages received with
             mars$flags.layer3grp flag set."
        ::= { marsMcGrpEntry 4 }

    marsMcGrpRxLayer3GrpResets OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Number of MARS_JOIN messages received with
             mars$flags.layer3grp flag reset."
```

```
        ::= { marsMcGrpEntry 5 }

    marsMcGrpRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create, delete or modify a
             row in this table.

             The value of this object has no effect on whether
             other objects in this conceptual row can be modified."
        ::= { marsMcGrpEntry 6 }

    --*************************************************************
    --  IP ATM MARS Host Map Object Definitions
    --*************************************************************

    marsHostMapTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsHostMapEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table caches mappings between IP multicast
             address to a list of ATM addresses that are
             configured or dynamically learned from the MARS.
             This address resolution is used for the host map.
             It supports the mapping of a block of multicast
             group addresses to a cluster member address.  In
             the case where a group block is associated with
             multiple cluster members, several entries are
             used to representing the relationship."
        ::= { marsObjects 3 }

    marsHostMapEntry OBJECT-TYPE
        SYNTAX  MarsHostMapEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry row contains attributes associated with
             the mapping between a multicast group block and an
             ATM address."
        INDEX { marsIndex,
                marsIfIndex,
                marsMcMinGrpAddr,
                marsMcMaxGrpAddr,
                marsHostMapAtmAddr }
        ::= { marsHostMapTable 1 }
```

```
   MarsHostMapEntry ::=
       SEQUENCE {
           marsHostMapAtmAddr     AtmAddr,
           marsHostMapRowType     INTEGER,
           marsHostMapRowStatus   RowStatus
       }

   marsHostMapAtmAddr OBJECT-TYPE
       SYNTAX  AtmAddr
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "The mapped cluster member ATM address."
       ::= { marsHostMapEntry 1 }

   marsHostMapRowType OBJECT-TYPE
       SYNTAX  INTEGER {
             static (1),
             dynamic (2)
           }
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "Method in which this entry row is created. The
            static (1) indicates that this row is created
            through configuration.  The dynamic (2) indicates
            that the row is created as the result of group
            address updates received at this MARS."
       ::= { marsHostMapEntry 2 }

   marsHostMapRowStatus OBJECT-TYPE
       SYNTAX  RowStatus
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "The object is used to create, delete or modify a
            row in this table.

            This object must not be set to 'active' until
            instances of all corresponding columns in the
            row of this table are appropriately configured.

            It is possible for an SNMP management station
            to set the row to 'notInService' and modify
            the entry and then set it back to 'active'
            with the following exception. That is, rows
            for which the corresponding instance of
            marsHostMapRowType has a value of 'dynamic'
```

```
            can not be modified or deleted."
        ::= { marsHostMapEntry 3 }

    --*****************************************************************
    --  IP ATM MARS Server Map Object Definitions
    --*****************************************************************

    marsServerMapTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsServerMapEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table caches mappings between IP multicast
             address to a list of MCS ATM addresses that are
             configured or dynamically learned from the MARS.
             This address resolution is used for the server map.
             It supports the mapping of a block of multicast
             group addresses to a MCS address.  In the case
             where a group block is associated with multiple
             MCSs, several entries are used to representing the
             relationship."
        ::= { marsObjects 4 }

    marsServerMapEntry OBJECT-TYPE
        SYNTAX  MarsServerMapEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry row contains attributes associated with
             the mapping between a multicast group block and an
             MCS address."
        INDEX { marsIndex,
                marsIfIndex,
                marsMcMinGrpAddr,
                marsMcMaxGrpAddr,
                marsServerMapAtmAddr }
        ::= { marsServerMapTable 1 }

    MarsServerMapEntry ::=
        SEQUENCE {
            marsServerMapAtmAddr   AtmAddr,
            marsServerMapRowType   INTEGER,
            marsServerMapRowStatus RowStatus
        }

    marsServerMapAtmAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS not-accessible
```

```
        STATUS  current
        DESCRIPTION
            "The mapped MCS ATM address."
        ::= { marsServerMapEntry 1 }

    marsServerMapRowType OBJECT-TYPE
        SYNTAX  INTEGER {
                static (1),
                dynamic (2)
              }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Method in which this entry row is created. The
             'static (1)' indicates that this row is created
             through configuration.  The 'dynamic (2)' indicates
             that the row is created as the result of group
             address updates received at this MARS."
        ::= { marsServerMapEntry 2 }

    marsServerMapRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create, delete or modify a
             row in this table.

             This object must not be set to 'active' until
             instances of all corresponding columns in the
             row of this table are appropriately configured.

             It is possible for an SNMP management station
             to set the row to 'notInService' and modify
             the entry and then set it back to 'active'
             with the following exception. That is, rows
             for which the corresponding instance of
             marsServerMapRowType has a value of 'dynamic'
             can not be modified or deleted."
        ::= { marsServerMapEntry 3 }

    --*****************************************************************
    --  IP ATM MARS VC Object Definition Table
    --*****************************************************************

    marsVcTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsVcEntry
        MAX-ACCESS  not-accessible
```

```
        STATUS current
        DESCRIPTION
            "This table contains information about open virtual circuits
             (VCs) that a MARS has.  For point to point circuit, each
             entry represents a single VC connection between this MARS
             ATM address to another party's ATM address.  In the case of
             point to multipoint connection where a ControlVc is attached
             with multiple leaf nodes, several entries are used  to
             represent the relationship.  An example of point to
             multi-point VC represented in a table is shown below.

                  MARS     VPI/VCI    MARS Addr     Party Addr
                    1         0,1         m1            p1
                    1         0,1         m1            p2
                    1         0,1         m1            p3"
        ::= { marsObjects 5 }

    marsVcEntry OBJECT-TYPE
        SYNTAX  MarsVcEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The objects contained in the entry are VC related attributes
             such as VC signalling type, control VC type, idle timer,
             negotiated MTU size, etc."
        INDEX { marsIndex,
                marsIfIndex,
                marsVcVpi,
                marsVcVci,
                marsVcPartyAddr }
        ::= { marsVcTable 1 }

    MarsVcEntry ::=
        SEQUENCE {
            marsVcVpi              INTEGER,
            marsVcVci              INTEGER,
            marsVcPartyAddr        AtmAddr,
            marsVcPartyAddrType    INTEGER,
            marsVcType             INTEGER,
            marsVcCtrlType         INTEGER,
            marsVcIdleTimer        INTEGER,
            marsVcCmi              INTEGER,
            marsVcEncapsType       INTEGER,
            marsVcNegotiatedMtu    INTEGER,
            marsVcRowStatus        RowStatus
          }

    marsVcVpi OBJECT-TYPE
```

```
        SYNTAX  INTEGER (0..4095)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The value of virtual path identifier (VPI). Since
             a VPI can be numbered 0, this sub-index can take
             a value of 0."
        ::= { marsVcEntry 1 }

    marsVcVci OBJECT-TYPE
        SYNTAX  INTEGER (0..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
             "The value of virtual circuit identifier (VCI).
              Since a VCI can be numbered 0, this sub-index
              can take a value of 0."
        ::= { marsVcEntry 2 }

    marsVcPartyAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "An ATM party address in which this VC is linked. The
             party type is identified by the marsVcPartyAddrType."
        ::= { marsVcEntry 5 }

    marsVcPartyAddrType OBJECT-TYPE
        SYNTAX  INTEGER {
              called (1),
              calling (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The party type is associated with the party address.  The
             'called (1)' indicates that the party address is a
             destination address which implies that VC is originated
             from this MARS. The 'calling (2)' indicates the VC was
             initiated externally to this MARS.  The party address is
             the source address."
        ::= { marsVcEntry 6 }

    marsVcType OBJECT-TYPE
        SYNTAX  INTEGER {
                 pvc (1),
                 svc (2)
```

```
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Circuit Connection type: permanent virtual circuit or
             switched virtual circuit."
        ::= { marsVcEntry 7 }

    marsVcCtrlType OBJECT-TYPE
        SYNTAX  INTEGER {
                pointToPointVC (1),
                clusterControlVC (2),
                serverControlVC (3)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Control VC type used to specify a particular connection.
               pointToPointVC (1):
                 used by the ATM endpoints (clients) or the MCS for
                 registration and queries.  This VC is set up from
                 a MARS client and MCS to this MARS.  It is a
                 bi-directional VC.
               clusterControlVC (2):
                 used by MARS to issue asynchronous updates to ATM
                 an ATM client.  This VC is established from the
                 MARs to the ATM client.
               serverControlVC (3):
                 used by MARS to issue asynchronous update to ATM
                 multicast servers.  This type of VC exists when at
                 least a MCS is being used."
        ::= { marsVcEntry 8 }

    marsVcIdleTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "minutes"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The idle timer associated with this VC.  The minimum
             suggested value is 1 minute and the recommended default
             value is 20 minutes."
        DEFVAL { 20 }
        ::= { marsVcEntry 9 }

    marsVcCmi OBJECT-TYPE
        SYNTAX  INTEGER (0..65535)
        MAX-ACCESS read-create
```

```
        STATUS  current
        DESCRIPTION
            "Cluster member identifier (CMI) which uniquely identifies
             each endpoint attached to the cluster.  This variable
             applies to each 'leaf node' of an outgoing control VC."
        ::= { marsVcEntry 10 }

    marsVcEncapsType OBJECT-TYPE
        SYNTAX  INTEGER {
              other (1),
              llcSnap (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The encapsulation type used when communicating over
             this VC."
        ::= { marsVcEntry 11 }

    marsVcNegotiatedMtu OBJECT-TYPE
        SYNTAX  INTEGER (1..65535)
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The negotiated MTU when communicating over this VC."
        ::= { marsVcEntry 12 }

    marsVcRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create, delete or modify a
             row in this table.

             A row cannot be made 'active' until instances of
             all corresponding columns in the row of this table
             are appropriately configured.

             While the marsVcIdleTimer in this conceptual
             row can be modified irrespective of the value
             of this object, all other objects in the row can
             not be modified when this object has a value
             of 'active'.

             It is possible for an SNMP management station
             to set the row to 'notInService' and modify
             the entry and then set it back to 'active'
```

```
            with the following exception. That is, rows
            for which the corresponding instance of
            marsVcType has a value of 'svc' can not be
            modified or deleted."
        ::= { marsVcEntry 13 }

    --****************************************************************
    --  IP ATM MARS Registered Cluster Member List Table
    --****************************************************************

    marsRegClientTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsRegClientEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains ATM identities of all the currently
             registered cluster members at a MARS.  Each entry represents
             one set of ATM identities associated with one cluster member
             or the MARS client."
        ::= { marsObjects 6 }

    marsRegClientEntry OBJECT-TYPE
        SYNTAX  MarsRegClientEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry row contains attributes associated with one
             register cluster member."
        INDEX { marsIndex,
                marsIfIndex,
                marsRegClientCmi}
        ::= { marsRegClientTable 1 }

    MarsRegClientEntry ::=
        SEQUENCE {
            marsRegClientCmi       INTEGER,
            marsRegClientAtmAddr   AtmAddr
        }

    marsRegClientCmi OBJECT-TYPE
        SYNTAX  INTEGER (0..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "This cluster member identifier is used as an auxiliary index
             for the entry in this table."
        ::= { marsRegClientEntry 1 }
```

```
   marsRegClientAtmAddr OBJECT-TYPE
       SYNTAX  AtmAddr
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "The registered client's ATM address."
       ::= { marsRegClientEntry 2 }


   --*************************************************************
   --  IP ATM MARS Registered Server Member List Table
   --*************************************************************

   marsRegMcsTable OBJECT-TYPE
       SYNTAX  SEQUENCE OF MarsRegMcsEntry
       MAX-ACCESS not-accessible
       STATUS current
       DESCRIPTION
           "This table contains ATM identities of all the currently
            registered MCSs at a MARS. Each entry represents one set
            of ATM identities associated with one MCS."
       ::= { marsObjects 7 }

   marsRegMcsEntry OBJECT-TYPE
       SYNTAX  MarsRegMcsEntry
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Each entry row contains attributes associated with one
            registered MCS."
       INDEX { marsIndex,
               marsIfIndex,
               marsRegMcsAtmAddr
             }
       ::= { marsRegMcsTable 1 }

   MarsRegMcsEntry ::=
       SEQUENCE {
           marsRegMcsAtmAddr  AtmAddr
       }

   marsRegMcsAtmAddr OBJECT-TYPE
       SYNTAX  AtmAddr
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "The registered MCS's ATM address."
       ::= { marsRegMcsEntry 1 }
```

```
--*****************************************************************
--  IP ATM MARS Statistics Object Definition Table
--*****************************************************************

marsStatTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF MarsStatEntry
    MAX-ACCESS not-accessible
    STATUS current


    DESCRIPTION
        "The table contains statistics collected at MARS."
    ::= {  marsObjects 8 }

marsStatEntry OBJECT-TYPE
    SYNTAX  MarsStatEntry
    MAX-ACCESS not-accessible
    STATUS  current
    DESCRIPTION
        "Each entry contains statistics collected at one MARS."
    INDEX { marsIndex, marsIfIndex }
    ::= { marsStatTable 1 }

MarsStatEntry ::=
    SEQUENCE {
        marsStatTxMultiMsgs        Counter32,
        marsStatTxGrpLstRplyMsgs   Counter32,
        marsStatTxRedirectMapMsgs  Counter32,
        marsStatTxMigrateMsgs      Counter32,
        marsStatTxNakMsgs          Counter32,
        marsStatTxJoinMsgs         Counter32,
        marsStatTxLeaveMsgs        Counter32,
        marsStatTxSjoinMsgs        Counter32,
        marsStatTxSleaveMsgs       Counter32,
        marsStatTxMservMsgs        Counter32,
        marsStatTxUnservMsgs       Counter32,
        marsStatRxReqMsgs          Counter32,
        marsStatRxGrpLstReqMsgs    Counter32,
        marsStatRxJoinMsgs         Counter32,
        marsStatRxLeaveMsgs        Counter32,
        marsStatRxMservMsgs        Counter32,
        marsStatRxUnservMsgs       Counter32,
        marsStatRxBlkJoinMsgs      Counter32,
        marsStatRegMemGroups       Counter32,
        marsStatRegMcsGroups       Counter32
    }

marsStatTxMultiMsgs OBJECT-TYPE
```

```
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MULTI transmitted by this MARS."
        ::= { marsStatEntry 1 }

    marsStatTxGrpLstRplyMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_GROUPLIST_REPLY messages transmitted
             by this MARS."
        ::= { marsStatEntry 2 }

    marsStatTxRedirectMapMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_REDIRECT_MAP messages transmitted by
             this MARS."
        ::= { marsStatEntry 3 }

    marsStatTxMigrateMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MIGRATE messages transmitted by
             this MARS."
        ::= { marsStatEntry 4 }

    marsStatTxNakMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_NAK messages transmitted by this MARS."
        ::= { marsStatEntry 5 }

    marsStatTxJoinMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_JOIN messages transmitted by this
```

```
            MARS."
        ::= { marsStatEntry 6 }

    marsStatTxLeaveMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_LEAVE messages transmitted by this
             MARS."
        ::= { marsStatEntry 7 }

    marsStatTxSjoinMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_SJOIN messages transmitted by this
             MARS."
        ::= { marsStatEntry 8 }

    marsStatTxSleaveMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_SLEAVE messages transmitted by this
             MARS."
        ::= { marsStatEntry 9 }

    marsStatTxMservMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MSERV messages transmitted by this
             MARS."
        ::= { marsStatEntry 10 }

    marsStatTxUnservMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_UNSERV messages transmitted by this
             MARS."
        ::= { marsStatEntry 11 }
```

```
   marsStatRxReqMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of MARS_REQUEST messages received by this
            MARS."
       ::= { marsStatEntry 12 }

   marsStatRxGrpLstReqMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of MARS_GROUPLIST_REQUEST messages received
            by this MARS."
       ::= { marsStatEntry 13 }

   marsStatRxJoinMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of MARS_JOINS messages received by this MARS."
       ::= { marsStatEntry 14 }

   marsStatRxLeaveMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of MARS_LEAVES messages received by this MARS."
       ::= { marsStatEntry 15 }

   marsStatRxMservMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of MARS_MSERV messages received by this MARS."
       ::= { marsStatEntry 16 }

   marsStatRxUnservMsgs OBJECT-TYPE
       SYNTAX  Counter32
       MAX-ACCESS read-only
       STATUS  current
       DESCRIPTION
           "Total number of MARS_UNSERV messages received by this MARS."
```

```
        ::= { marsStatEntry 17 }

    marsStatRxBlkJoinMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of block joins messages received by this MARS."
        ::= { marsStatEntry 18 }

    marsStatRegMemGroups OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of IP multicast groups with 1 or more joined
             cluster members."
        ::= { marsStatEntry 19 }

    marsStatRegMcsGroups OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of IP multicast groups with 1 or more joined
             MCSs."
        ::= { marsStatEntry 20 }

    --*****************************************************************
    --  IP ATM MARS MCS Object Definitions
    --*****************************************************************

    marsMcsObjects OBJECT IDENTIFIER ::= { marsMIB 3 }

    marsMcsTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsMcsEntry
        MAX-ACCESS  not-accessible
        STATUS current
        DESCRIPTION
            "The objects defined in this table are used for
             the management of a multicast server (MCS)."
        ::= {  marsMcsObjects 1 }

    marsMcsEntry OBJECT-TYPE
        SYNTAX  MarsMcsEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
```

```
            "Each entry contains a MCS and its associated
             attributes."
        INDEX { marsMcsIndex, marsMcsIfIndex }
        ::= { marsMcsTable 1 }

    MarsMcsEntry ::=
        SEQUENCE {
            marsMcsIndex                    Integer32,
            marsMcsIfIndex                  InterfaceIndex,
            marsMcsAddr                     AtmAddr,
            marsMcsDefaultMarsAddr          AtmAddr,
            marsMcsRegistration             INTEGER,
            marsMcsSsn                      Unsigned32,
            marsMcsDefaultMtu               INTEGER,
            marsMcsFailureTimer             INTEGER,
            marsMcsRetranDelayTimer         INTEGER,
            marsMcsRdmMulReqAddRetrTimer    INTEGER,
            marsMcsRdmVcRevalidateTimer     INTEGER,
            marsMcsRegisterRetrInterval     INTEGER,
            marsMcsRegisterRetrLimit        INTEGER,
            marsMcsRegWithMarsRdmTimer      INTEGER,
            marsMcsForceWaitTimer           INTEGER,
            marsMcsIdleTimer                INTEGER,
            marsMcsLmtToMissRedirMapTimer   INTEGER,
            marsMcsRowStatus                RowStatus
        }

    marsMcsIndex OBJECT-TYPE
        SYNTAX  Integer32(1..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The auxiliary variable used to identify instances
             of the columnar objects in the MCS table."
        ::= { marsMcsEntry 1 }

    marsMcsIfIndex OBJECT-TYPE
        SYNTAX  InterfaceIndex
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The ifIndex of the interface that the MCS is
             associated with."
        ::= { marsMcsEntry 2 }

    marsMcsAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS read-create
```

```
        STATUS  current
        DESCRIPTION
            "The ATM address associated with the MCS."
        ::= { marsMcsEntry 3 }

    marsMcsDefaultMarsAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The default MARS ATM address which is needed to
             setup the initial signalling path between a MCS
             and its associated MARS."
        ::= { marsMcsEntry 4 }

    marsMcsRegistration OBJECT-TYPE
        SYNTAX  INTEGER {
              notRegistered (1),
              registering (2),
              registered (3),
              reRegisteringFault (4),
              reRegisteringRedirMap (5)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "An indication with regards to the registration
             STATUS of this MCS. The registration codes of
             'notRegistered (1)', 'registered (2)', and
             registered (3) are self-explanatory. The
             'reRegisteringFault (4)' indicates the MCS is
             in the process of re-registering with a MARS due
             to some fault conditions.  The 'reRegisteringRedMap
             (5)' status code shows that MCS is re-registering
             because it has received a MARS_REDIRECT_MAP message
             and was told to register with a shift MARS."
        ::= { marsMcsEntry 5 }

    marsMcsSsn OBJECT-TYPE
        SYNTAX  Unsigned32
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The MCS own 32 bit Server Sequence Number.  It
             is used to track the Mars sequence number."
        ::= { marsMcsEntry 6 }

    marsMcsDefaultMtu OBJECT-TYPE
```

```
        SYNTAX  INTEGER (1..65535)
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The default maximum transmission unit (MTU) used
             for this cluster.  Note that the actual size used
             for a VC between two members of the cluster may be
             negotiated during connection setup and may be
             different than this value.
             Default value = 9180 bytes."
        DEFVAL { 9180 }
        ::= { marsMcsEntry 7 }

    marsMcsFailureTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "A timer used to flag the failure of last MARS_MULTI
             to arrive.  Default value = 10 seconds (recommended)."
        DEFVAL { 10 }
        ::= { marsMcsEntry 8 }

    marsMcsRetranDelayTimer OBJECT-TYPE
        SYNTAX  INTEGER (5..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The delay timer for sending out new MARS_REQUEST
             for the group after the MCS learned that there
             is no other group in the cluster.  The timer must
             be set between 5 and 10 seconds inclusive."
        ::= { marsMcsEntry 9 }

    marsMcsRdmMulReqAddRetrTimer OBJECT-TYPE
        SYNTAX  INTEGER (5..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The initial random L_MULTI_RQ/ADD retransmit timer
             which can be set between 5 and 10 seconds inclusive."
        ::= { marsMcsEntry 10 }

    marsMcsRdmVcRevalidateTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..10)
```

```
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The random time to set VC_revalidate flag.  The
             timer value ranges between 1 and 10 seconds
                inclusive."
        ::= { marsMcsEntry 11 }

    marsMcsRegisterRetrInterval OBJECT-TYPE
        SYNTAX  INTEGER(5..2147483647)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "MARS_MSERV/UNSERV retransmit interval. The minimum
             and recommended values are 5 and 10 seconds,
             respectively."
        DEFVAL { 10 }
        ::= { marsMcsEntry 12 }

    marsMcsRegisterRetrLimit OBJECT-TYPE
        SYNTAX  INTEGER (0..5)
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "MARS_MSERV/UNSERV retransmit limit. The maximum value
             is 5."
        ::= { marsMcsEntry 13 }

    marsMcsRegWithMarsRdmTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..10)
        UNITS   "seconds"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Random time for a MCS to register with a MARS."
        ::= { marsMcsEntry 14 }

    marsMcsForceWaitTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "minutes"
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Force wait if MARS re-registration is looping.
             The minimum value is 1 minute."
        ::= { marsMcsEntry 15 }
```

```
   marsMcsLmtToMissRedirMapTimer OBJECT-TYPE
       SYNTAX  INTEGER (1..4)
       UNITS   "seconds"
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "Timer limit for MCS to miss MARS_REDIRECT_MAPS."
       ::= { marsMcsEntry 16 }

   marsMcsIdleTimer OBJECT-TYPE
       SYNTAX  INTEGER (1..2147483647)
       UNITS   "minutes"
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "The configurable inactivity timer associated with a
            MCS. When a VC is created at this MCS, it gets
            the idle timer value from this configurable timer.
            The minimum suggested value is 1 minute and the
            recommended default value is 20 minutes."
       DEFVAL { 20 }
       ::= { marsMcsEntry 17 }

   marsMcsRowStatus OBJECT-TYPE
       SYNTAX  RowStatus
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "The object is used to create, delete or modify a
            row in this table.

            A row cannot be made 'active' until instances of
            all corresponding columns in the row of this table
            are appropriately configured and until the agent
            has also created a corresponding row in the
            marsMcsStatTable.

            When this object has a value of 'active', the
            following columnar objects can not be modified:

              marsMcsDefaultMarsAddr,
              marsMcsSsn,
              marsMcsRegstration,
              marsMcsDefaultMtu

            while other objects in this conceptual row can be
            modified irrespective of the value of this object.
```

```
            Deletion of this row is allowed regardless of
            whether or not a row in any associated tables
            (i.e., marsMcsVcTable) still exists or is in
            use. Once this row is deleted, it is recommended
            that the agent or the SNMP management station
            (if possible) through the set command deletes
            any stale rows that are associated with this
            row."
        ::= { marsMcsEntry 18 }


    --****************************************************************
    -- IP ATM MARS MCS Multicast Group Address Object Definitions
    --****************************************************************

    marsMcsMcGrpTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsMcsMcGrpEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains a list of IP multicast group address
             blocks associated by a MARS MCS.  The MCS uses the
             information contained in list to advertise its multicast
             group service to the MARS.
             Each row can be created or deleted via configuration."
        ::= { marsMcsObjects 2 }

    marsMcsMcGrpEntry OBJECT-TYPE
        SYNTAX  MarsMcsMcGrpEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry represents a consecutive block of multicast
             group addresses."
        INDEX { marsMcsIndex,
                marsMcsIfIndex,
                marsMcsMcMinGrpAddr,
                marsMcsMcMaxGrpAddr }
        ::= { marsMcsMcGrpTable 1 }

    MarsMcsMcGrpEntry ::=
        SEQUENCE {
            marsMcsMcMinGrpAddr           IpAddress,
            marsMcsMcMaxGrpAddr           IpAddress,
            marsMcsMcGrpRowStatus         RowStatus
        }

    marsMcsMcMinGrpAddr OBJECT-TYPE
```

```
        SYNTAX  IpAddress
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Minimum multicast group address - the min and max
             multicast forms multi-group block.  If the MinGrpAddr
             and MaxGrpAddr are the same, it indicates that this
             block contains a single group address.   Since the
             block joins are no allowed by a MCS as implied in
             the RFC2022, the MinGrpAddr and MaxGrpAddress should
             be set to the same value at this time when an entry
             row is created."
        ::= { marsMcsMcGrpEntry 1 }

    marsMcsMcMaxGrpAddr OBJECT-TYPE
        SYNTAX  IpAddress
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Maximum multicast group address - the min and max
             multicast forms a multi-group block.  If the
             MinGrpAddr and MaxGrpAddr are the same, it indicates
             that this block contains a single group address.
             Since the block joins are no allowed by a MCS as
             implied in the RFC2022, the MinGrpAddr and
             MaxGrpAddress should be set to the same value at
             this time when an entry row is created."
        ::= { marsMcsMcGrpEntry 2 }

    marsMcsMcGrpRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create or delete a row in this
             table.

             Since other objects in this row are not-accessible
             'index-objects', the value of this object has no
             effect on whether those objects in this conceptual
             row can be modified."
        ::= { marsMcsMcGrpEntry 3 }

    --*****************************************************************
    -- IP ATM MARS MCS Backup MARS Object Definitions
    --*****************************************************************

    marsMcsBackupMarsTable OBJECT-TYPE
```

```
        SYNTAX  SEQUENCE OF MarsMcsBackupMarsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains a list of backup MARS addresses that
             a MCS can make contact to in case of failure for
             connecting to the primary server. The list of addresses
             is in descending order of preference. It should be noted
             that the backup list provided by the MARS to the MCS
             via the MARS_REDIRECT_MAP message has a higher preference
             than addresses that are manually configured into the MCS.
             When such a list is received from the MARS, this information
             should be inserted at the top of the list.
             Each row can be created or deleted via configuration."
        ::= {  marsMcsObjects 3 }

    marsMcsBackupMarsEntry OBJECT-TYPE
        SYNTAX  MarsMcsBackupMarsEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry represents an ATM address of a backup MARS."
        INDEX { marsMcsIndex,
                marsMcsIfIndex,
                marsMcsBackupMarsPriority,
                marsMcsBackupMarsAddr }
        ::= { marsMcsBackupMarsTable 1 }

    MarsMcsBackupMarsEntry ::=
        SEQUENCE {
            marsMcsBackupMarsPriority     Unsigned32,
            marsMcsBackupMarsAddr         AtmAddr,
            marsMcsBackupMarsRowStatus    RowStatus
        }

    marsMcsBackupMarsPriority OBJECT-TYPE
        SYNTAX  Unsigned32(0..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The priority associated with a backup MARS. A lower
             priority value inidcates a higher preference."
        ::= { marsMcsBackupMarsEntry 1 }

    marsMcsBackupMarsAddr OBJECT-TYPE
        SYNTAX  AtmAddr
        MAX-ACCESS not-accessible
        STATUS  current
```

```
        DESCRIPTION
            "The ATM address associated with a backup MARS."
        ::= { marsMcsBackupMarsEntry 2 }

    marsMcsBackupMarsRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create or delete a row in this
             table.

             Since other objects in this row are not-accessible
             'index-objects', the value of this object has no
             effect on whether those objects in this conceptual
             row can be modified."
        ::= { marsMcsBackupMarsEntry 3 }

    --*****************************************************************
    --  IP ATM MARS MCS VC Object Definition Table
    --*****************************************************************

    marsMcsVcTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsMcsVcEntry
        MAX-ACCESS  not-accessible
        STATUS current
        DESCRIPTION
            "This table contains information about open virtual
             circuits (VCs) that a MCS has.  For point to
             point circuit, each entry represents a single VC
             connection between this MCS ATM address to another
             party ATM address.  In the case of point to
             multipoint connection where a single source address
             is associated with multiple destinations, several
             entries are used to represent the relationship.  An
             example of point to multi-point VC represented in a
             table is shown below.

                MCS      VPI/VCI    Grp Addr1/Addr2    Part Addr
                 1         0,1          g1,g2             p1
                 1         0,1          g1,g2             p2
                 1         0,1          g1,g2             p3"
        ::= {  marsMcsObjects 4 }

    marsMcsVcEntry OBJECT-TYPE
        SYNTAX  MarsMcsVcEntry
        MAX-ACCESS not-accessible
        STATUS  current
```

```
        DESCRIPTION
            "The objects contained in the entry are VC related
             attributes such as VC signalling type, control VC
             type, idle timer, negotiated MTU size, etc."
        INDEX { marsMcsIndex,
                marsMcsIfIndex,
                marsMcsVcVpi,
                marsMcsVcVci,
                marsMcsVcMinGrpAddr,
                marsMcsVcMaxGrpAddr,
                marsMcsVcPartyAddr }
        ::= { marsMcsVcTable 1 }

    MarsMcsVcEntry ::=
        SEQUENCE {
            marsMcsVcVpi           INTEGER,
            marsMcsVcVci           INTEGER,
            marsMcsVcMinGrpAddr    IpAddress,
            marsMcsVcMaxGrpAddr    IpAddress,
            marsMcsVcPartyAddr     AtmAddr,
            marsMcsVcPartyAddrType INTEGER,
            marsMcsVcType          INTEGER,
            marsMcsVcCtrlType      INTEGER,
            marsMcsVcIdleTimer     INTEGER,
            marsMcsVcRevalidate    TruthValue,
            marsMcsVcEncapsType    INTEGER,
            marsMcsVcNegotiatedMtu INTEGER,
            marsMcsVcRowStatus     RowStatus
        }

    marsMcsVcVpi OBJECT-TYPE
        SYNTAX  INTEGER (0..4095)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "The value of virtual path identifier (VPI). Since
             a VPI can be numbered 0, this sub-index can take
             a value of 0."
        ::= { marsMcsVcEntry 1 }

    marsMcsVcVci OBJECT-TYPE
        SYNTAX  INTEGER (0..65535)
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
             "The value of virtual circuit identifier (VCI). Since
             a VCI can be numbered 0, this sub-index can take
             a value of 0."
```

```
        ::= { marsMcsVcEntry 2 }

   marsMcsVcMinGrpAddr OBJECT-TYPE
       SYNTAX  IpAddress
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Minimum IP multicast group address - the min and
            max multicast forms a multi-group block which is
            associated with a VC.  If the MinGrpAddr and
            MaxGrpAddr are the same, it indicates that the
            size of multi-group block is 1, a single IP group."
       ::= { marsMcsVcEntry 3 }

   marsMcsVcMaxGrpAddr OBJECT-TYPE


       SYNTAX  IpAddress
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "Maximum IP multicast group address - the min
            and max multicast forms a multi-group block
            which is associated with a VC. If the MinGrpAddr
            and MaxGrpAddr are the same, it indicates that the
            size of multi-group block is 1, a single IP group."
       ::= { marsMcsVcEntry 4 }

   marsMcsVcPartyAddr OBJECT-TYPE
       SYNTAX  AtmAddr
       MAX-ACCESS not-accessible
       STATUS  current
       DESCRIPTION
           "An ATM party address in which this VC is linked.
            The party type is identified by the
            marsMcsVcPartyAddrType."
       ::= { marsMcsVcEntry 5 }

   marsMcsVcPartyAddrType OBJECT-TYPE
       SYNTAX  INTEGER {
             called (1),
             calling (2)
           }
       MAX-ACCESS read-create
       STATUS  current
       DESCRIPTION
           "The party type is associated with the party address.
            The called (1) indicates that the party address is
```

```
            a destination address which implies that VC is
            originated from this MCS.  The calling (2) indicates
            the VC was initiated externally to this MCS.  In this
            case, the party address is the source address."
        ::= { marsMcsVcEntry 6 }

    marsMcsVcType OBJECT-TYPE
        SYNTAX  INTEGER {
              pvc (1),
              svc (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Circuit Connection type: permanent virtual circuit or
             switched virtual circuit."
        ::= { marsMcsVcEntry 7 }


    marsMcsVcCtrlType OBJECT-TYPE
        SYNTAX  INTEGER {
               pointToPointVC (1),
               serverControlVC (2),
               pointToMultiPointVC (3)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "Control VC type used to specify a particular connection.
               pointToPointVC (1):
                 used by the ATM Clients for the registration and
                 queries.  This VC or the initial signalling path is
                 set up from the source MCS to a MARS. It is
                 bi-directional.
               serverControlVC (2):
                 used by a MARS to issue asynchronous updates to an
                 ATM Client.  This VC is established from the MARS
                 to the MCS.
               pointToMultiPointVC (3):
                 used by the client to transfer multicast data
                 packets from layer 3.  This VC is established from
                 this VC to a cluster member."
        ::= { marsMcsVcEntry 8 }

    marsMcsVcIdleTimer OBJECT-TYPE
        SYNTAX  INTEGER (1..2147483647)
        UNITS   "minutes"
        MAX-ACCESS read-create
```

```
        STATUS  current
        DESCRIPTION
            "The idle timer associated with this VC. The minimum
             suggested value is 1 minute and the recommended
             default value is 20 minutes."
        DEFVAL { 20 }
        ::= { marsMcsVcEntry 9 }

    marsMcsVcRevalidate OBJECT-TYPE
        SYNTAX  TruthValue
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "A flag associated with an open and active multipoint
             VC. It is checked every time a packet is queued for
             transmission on that VC. The object has the value of
             true (1) if revalidate is required and the value
             false (2) otherwise."
        ::= { marsMcsVcEntry 10 }

    marsMcsVcEncapsType OBJECT-TYPE
        SYNTAX  INTEGER {
              other (1),
              llcSnap (2)
            }
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The encapsulation type used when communicating over
             this VC."
        ::= { marsMcsVcEntry 11 }

    marsMcsVcNegotiatedMtu OBJECT-TYPE
        SYNTAX  INTEGER (1..65535)
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The negotiated MTU when communicating over this VC."
        ::= { marsMcsVcEntry 12 }

    marsMcsVcRowStatus OBJECT-TYPE
        SYNTAX  RowStatus
        MAX-ACCESS read-create
        STATUS  current
        DESCRIPTION
            "The object is used to create, delete or modify a
             row in this table.
```

```
            A row cannot be made 'active' until instances of
            all corresponding columns in the row of this table
            are appropriately configured.

            While objects: marsMcsVcIdleTimer and
            marsMcsVcRevalidate in this conceptual row can
            be modified irrespective of the value of this
            object, all other objects in the row can not be
            modified when this object has a value of 'active'.

            It is possible for an SNMP management station
            to set the row to 'notInService' and modify
            the entry and then set it back to 'active'
            with the following exception. That is, rows
            for which the corresponding instance of
            marsMcsVcType has a value of 'svc' can not
            be modified or deleted."
        ::= { marsMcsVcEntry 13 }

    --*************************************************************
    --  IP ATM MARS MCS Statistics Definition Table
    --*************************************************************

    marsMcsStatTable OBJECT-TYPE
        SYNTAX  SEQUENCE OF MarsMcsStatEntry
        MAX-ACCESS  not-accessible
        STATUS current
        DESCRIPTION
            "The table contains statistics collected at MARS MCSs."
        ::= {  marsMcsObjects 5 }

    marsMcsStatEntry OBJECT-TYPE
        SYNTAX  MarsMcsStatEntry
        MAX-ACCESS not-accessible
        STATUS  current
        DESCRIPTION
            "Each entry contains statistics collected at one
             MARS MCS."
        INDEX { marsMcsIndex, marsMcsIfIndex }
        ::= { marsMcsStatTable 1 }

    MarsMcsStatEntry ::=
        SEQUENCE {
            marsMcsStatTxReqMsgs       Counter32,
            marsMcsStatTxMservMsgs     Counter32,
            marsMcsStatTxUnservMsgs    Counter32,
            marsMcsStatRxMultiMsgs     Counter32,
            marsMcsStatRxSjoinMsgs     Counter32,
```

```
            marsMcsStatRxSleaveMsgs    Counter32,
            marsMcsStatRxNakMsgs       Counter32,
            marsMcsStatRxMigrateMsgs   Counter32,
            marsMcsStatFailMultiMsgs   Counter32
        }

    marsMcsStatTxReqMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_REQUEST messages transmitted
             from this MCS."
        ::= { marsMcsStatEntry 1 }

    marsMcsStatTxMservMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MSERV messages transmitted from
             this MCS."
        ::= { marsMcsStatEntry 2 }

    marsMcsStatTxUnservMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_UNSERV messages transmitted from
             this MCS."
        ::= { marsMcsStatEntry 3 }

    marsMcsStatRxMultiMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MULTI messages received by
             this MCS."
        ::= { marsMcsStatEntry 4 }

    marsMcsStatRxSjoinMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_SJOIN messages received by
```

```
            this MCS."
        ::= { marsMcsStatEntry 5 }

    marsMcsStatRxSleaveMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_SLEAVE messages received
             by this MCS."
        ::= { marsMcsStatEntry 6 }

    marsMcsStatRxNakMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_NAK messages received
             by this MCS."
        ::= { marsMcsStatEntry 7 }

    marsMcsStatRxMigrateMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of MARS_MIGRATE messages received
             by this MCS."
        ::= { marsMcsStatEntry 8 }

    marsMcsStatFailMultiMsgs OBJECT-TYPE
        SYNTAX  Counter32
        MAX-ACCESS read-only
        STATUS  current
        DESCRIPTION
            "Total number of timeouts occurred indicating
             failure of the last MARS_MULTI to arrive."
        ::= { marsMcsStatEntry 9 }

    --*****************************************************************
    --  IP ATM MARS Notification Definitions
    --*****************************************************************

    marsTrapInfo OBJECT IDENTIFIER ::= { marsMIB 0 }

    marsFaultTrap NOTIFICATION-TYPE
        OBJECTS {
            marsAddr,
```

```
            marsServStatus
           }
       STATUS  current
       DESCRIPTION
           "This trap/inform is sent to the manager whenever
            there is a fault condition occurred on a MARS."
       ::= { marsTrapInfo 1 }

   --*****************************************************************
   --  IP ATM MARS Conformance Definitions
   --*****************************************************************

   marsConformance       OBJECT IDENTIFIER ::= { marsMIB 4 }
   marsClientConformance OBJECT IDENTIFIER ::= { marsConformance 1 }
   marsServerConformance OBJECT IDENTIFIER ::= { marsConformance 2 }
   marsMcsConformance    OBJECT IDENTIFIER ::= { marsConformance 3 }

   marsClientCompliances OBJECT IDENTIFIER ::= { marsClientConformance 1 }
   marsClientGroups      OBJECT IDENTIFIER ::= { marsClientConformance 2 }

   marsServerCompliances OBJECT IDENTIFIER ::= { marsServerConformance 1 }


   marsServerGroups      OBJECT IDENTIFIER ::= { marsServerConformance 2 }

   marsMcsCompliances    OBJECT IDENTIFIER ::= { marsMcsConformance 1 }
   marsMcsGroups         OBJECT IDENTIFIER ::= { marsMcsConformance 2 }

   --*****************************************************************
   -- MARS Client Compliance Statements
   --*****************************************************************

   marsClientCompliance MODULE-COMPLIANCE
       STATUS  current
       DESCRIPTION
           "The compliance statement for entities that are required
            for the management of MARS clients."
       MODULE
           MANDATORY-GROUPS {
            marsClientGroup
           }

       OBJECT marsClientAddr
       MIN-ACCESS read-only
       DESCRIPTION
         "Write access is not required."

       OBJECT marsClientDefaultMarsAddr
```

```
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientHsn
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientRegistration
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientCmi
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientDefaultMtu
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."


        OBJECT marsClientFailureTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientRetranDelayTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientRdmMulReqAddRetrTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientRdmVcRevalidateTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientJoinLeaveRetrInterval
        MIN-ACCESS read-only
        DESCRIPTION
```

```
          "Write access is not required."

        OBJECT marsClientJoinLeaveRetrLimit
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientRegWithMarsRdmTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientForceWaitTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientLmtToMissRedirMapTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientIdleTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientMcGrpRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientBackupMarsRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcCtrlType
```

```
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcIdleTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcRevalidate
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcEncapsType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcNegotiatedMtu
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsClientVcRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        ::= { marsClientCompliances 1 }

    marsClientGroup OBJECT-GROUP
        OBJECTS {
            marsClientAddr,
            marsClientDefaultMarsAddr,
            marsClientHsn,
            marsClientRegistration,
            marsClientCmi,
            marsClientDefaultMtu,
            marsClientFailureTimer,
            marsClientRetranDelayTimer,
            marsClientRdmMulReqAddRetrTimer,
            marsClientRdmVcRevalidateTimer,
            marsClientJoinLeaveRetrInterval,
            marsClientJoinLeaveRetrLimit,
            marsClientRegWithMarsRdmTimer,
            marsClientForceWaitTimer,
            marsClientIdleTimer,
```

```
            marsClientLmtToMissRedirMapTimer,
            marsClientRowStatus,
            marsClientMcGrpRowStatus,
            marsClientBackupMarsRowStatus,
            marsClientVcPartyAddrType,
            marsClientVcType,
            marsClientVcCtrlType,
            marsClientVcIdleTimer,
            marsClientVcRevalidate,
            marsClientVcEncapsType,
            marsClientVcNegotiatedMtu,
            marsClientVcRowStatus,
            marsClientStatTxReqMsgs,
            marsClientStatTxJoinMsgs,
            marsClientStatTxLeaveMsgs,
            marsClientStatTxGrpLstReqMsgs,
            marsClientStatRxJoinMsgs,
            marsClientStatRxLeaveMsgs,
            marsClientStatRxMultiMsgs,
            marsClientStatRxNakMsgs,
            marsClientStatRxGrpLstRplyMsgs,
            marsClientStatRxMigrateMsgs,
            marsClientStatFailMultiMsgs
           }
        STATUS  current
        DESCRIPTION
            "A collection of objects to be implemented in a MIB
             for the management of MARS clients."
        ::= { marsClientGroups 1 }

    --*****************************************************************
    -- MARS Server Compliance Statements
    --*****************************************************************

    marsServerCompliance MODULE-COMPLIANCE
        STATUS  current
        DESCRIPTION
            "The compliance statement for entities that are required
             for the management of MARS servers."
        MODULE -- this module
            MANDATORY-GROUPS {
             marsServerGroup,
             marsServerEventGroup
            }

        OBJECT marsAddr
        MIN-ACCESS read-only
        DESCRIPTION
```

```
          "Write access is not required."

        OBJECT marsLocal
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsServStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsServType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsServPriority
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsRedirMapMsgTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsCsn
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsSsn
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcGrpAddrUsage
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcGrpRowStatus
```

```
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsHostMapRowType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsHostMapRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsServerMapRowType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsServerMapRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcPartyAddrType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcCtrlType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcIdleTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcCmi
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
```

```
        OBJECT marsVcEncapsType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcNegotiatedMtu
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsVcRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        ::= { marsServerCompliances 1 }

    marsServerGroup OBJECT-GROUP
          OBJECTS {
            marsAddr,
            marsLocal,
            marsServStatus,
            marsServType,
            marsServPriority,
            marsRedirMapMsgTimer,
            marsCsn,
            marsSsn,
            marsRowStatus,
            marsMcGrpAddrUsage,
            marsMcGrpRxLayer3GrpSets,
            marsMcGrpRxLayer3GrpResets,
            marsMcGrpRowStatus,
            marsHostMapRowType,
            marsHostMapRowStatus,
            marsServerMapRowType,
            marsServerMapRowStatus,
            marsVcPartyAddrType,
            marsVcType,
            marsVcCtrlType,
            marsVcIdleTimer,
            marsVcCmi,
            marsVcEncapsType,
            marsVcNegotiatedMtu,
            marsVcRowStatus,
            marsRegClientAtmAddr,
            marsRegMcsAtmAddr,
            marsStatTxMultiMsgs,
            marsStatTxGrpLstRplyMsgs,
```

```
            marsStatTxRedirectMapMsgs,
            marsStatTxMigrateMsgs,
            marsStatTxNakMsgs,
            marsStatTxJoinMsgs,
            marsStatTxLeaveMsgs,
            marsStatTxSjoinMsgs,
            marsStatTxSleaveMsgs,
            marsStatTxMservMsgs,
            marsStatTxUnservMsgs,
            marsStatRxReqMsgs,
            marsStatRxGrpLstReqMsgs,
            marsStatRxJoinMsgs,
            marsStatRxLeaveMsgs,
            marsStatRxMservMsgs,
            marsStatRxUnservMsgs,
            marsStatRxBlkJoinMsgs,
            marsStatRegMemGroups,
            marsStatRegMcsGroups
           }
        STATUS  current
        DESCRIPTION
            "A collection of objects to be implemented in a MIB
             for the management of MARS servers."
        ::= { marsServerGroups 1 }

    marsServerEventGroup NOTIFICATION-GROUP
        NOTIFICATIONS { marsFaultTrap }
        STATUS  current
        DESCRIPTION
            "A collection of events that can be generated from
             a MARS server."
        ::= { marsServerGroups 2 }

    --*************************************************************
    -- MARS Multicast Server (MCS) Compliance Statements
    --*************************************************************

    marsMcsCompliance MODULE-COMPLIANCE
        STATUS  current
        DESCRIPTION
            "The compliance statement for entities that are required
             for the management of MARS multicast servers (MCS)."
        MODULE
            MANDATORY-GROUPS {
             marsMcsGroup
            }

        OBJECT marsMcsAddr
```

```
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsDefaultMarsAddr
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsRegistration
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsSsn
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsDefaultMtu
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsFailureTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsRetranDelayTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsRdmMulReqAddRetrTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsRdmVcRevalidateTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsRegisterRetrInterval
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."
```

```
        OBJECT marsMcsRegisterRetrLimit
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsForceWaitTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsLmtToMissRedirMapTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsIdleTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsMcGrpRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsBackupMarsRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcPartyAddrType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcCtrlType
        MIN-ACCESS read-only
        DESCRIPTION
```

```
          "Write access is not required."

        OBJECT marsMcsVcIdleTimer
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcRevalidate
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcEncapsType
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcNegotiatedMtu
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        OBJECT marsMcsVcRowStatus
        MIN-ACCESS read-only
        DESCRIPTION
          "Write access is not required."

        ::= { marsMcsCompliances 1 }

    marsMcsGroup OBJECT-GROUP
        OBJECTS {
            marsMcsAddr,
            marsMcsDefaultMarsAddr,
            marsMcsRegistration,
            marsMcsSsn ,
            marsMcsDefaultMtu,
            marsMcsFailureTimer,
            marsMcsRetranDelayTimer,
            marsMcsRdmMulReqAddRetrTimer,
            marsMcsRdmVcRevalidateTimer,
            marsMcsRegisterRetrInterval,
            marsMcsRegisterRetrLimit,
            marsMcsRegWithMarsRdmTimer,
            marsMcsForceWaitTimer,
            marsMcsIdleTimer,
            marsMcsLmtToMissRedirMapTimer,
            marsMcsRowStatus,
            marsMcsMcGrpRowStatus,
```

```
            marsMcsVcPartyAddrType,
            marsMcsBackupMarsRowStatus,
            marsMcsVcType,
            marsMcsVcCtrlType,
            marsMcsVcIdleTimer,
            marsMcsVcRevalidate,
            marsMcsVcEncapsType,
            marsMcsVcNegotiatedMtu,
            marsMcsVcRowStatus,
            marsMcsStatTxReqMsgs,
            marsMcsStatTxMservMsgs,
            marsMcsStatTxUnservMsgs,
            marsMcsStatRxMultiMsgs,
            marsMcsStatRxSjoinMsgs,
            marsMcsStatRxSleaveMsgs,
            marsMcsStatRxNakMsgs,
            marsMcsStatRxMigrateMsgs,
            marsMcsStatFailMultiMsgs
           }
        STATUS  current
        DESCRIPTION
            "A collection of objects to be implemented in a MIB
             for the management of MARS multicast servers (MCS)."
        ::= { marsMcsGroups 1 }

      END
```

4. Acknowledgments

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5. References

[1] Armitage, G., "Support for Multicast over UNI 3.0/3.1 based ATM Networks", RFC 2022, November 1996.

[2] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Structure of Management Information for Version 2 of the Simple Network Management Protocol (SNMPv2)", RFC 1902, January 1996.

[3] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Textual Conventions for Version 2 of the of the Simple Network Management Protocol (SNMPv2)", RFC 1903, January 1996.

[4] SNMPv2 Working Group, Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Conformance Statements for Version 2 of the of the Simple Network Management Protocol (SNMPv2)", RFC 1904, January 1996.

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

[6] SNMPv2 Working Group, 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.

[7] McCloghrie, K., and M. Rose, Editors, "Management Information Base for Network Management of TCP/IP-based internets: MIB-II", STD 17, RFC 1213, March 1991.

[8] SNMPv3 Working Group, Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of Simple Network Management Protocol (SNMPv3)", RFC 2274, January 1998.

[9] SNMPv3 Working Group, Wijnen, B., Presuhn, R., and K. McCloghire, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", RFC 2275, January 1998.

6. Security Considerations

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 object 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.

SNMPv1 by itself is such an insecure 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 SET (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 2274 [8] and the View-based Access Control Model RFC 2275 [9] is recommended.

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

Note: read-access in fact may also need access-control.

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8. Full Copyright Statement