Proxy Mobile IPv6 Management Information Base

Abstract

This memo defines a portion of the Proxy Mobile IPv6 Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, the Proxy Mobile IPv6 MIB can be used to monitor and control the mobile access gateway (MAG) and the local mobility anchor (LMA) functions of a Proxy Mobile IPv6 (PMIPv6) entity.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

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1. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP).

Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

2. Overview

2.1. The Proxy Mobile IPv6 Protocol Entities

Proxy Mobile IPv6 (PMIPv6) [RFC5213] is an extension to the Mobile IPv6 (MIPv6) protocol that facilitates network-based localized mobility management (NETLMM) for IPv6 nodes in a PMIPv6 domain. There are three types of entities envisaged by the PMIPv6 protocol.

mobile node (MN): In the PMIPv6 context, this term is used to refer to an IP host or router whose mobility is managed by the network.

local mobility anchor (LMA): Local Mobility Anchor is the home agent for the mobile node in a Proxy Mobile IPv6 domain. It is the topological anchor point for the mobile node’s home network prefix(es) and is the entity that manages the mobile node’s binding state. The local mobility anchor has the functional capabilities of a home agent as defined in the Mobile IPv6 base specification [RFC6275] with the additional capabilities required for supporting the Proxy Mobile IPv6 protocol as defined in the PMIPv6 specification [RFC5213].

mobile access gateway (MAG): Mobile Access Gateway is the entity on an access router that manages the mobility-related signaling for a mobile node that is attached to its access link. It is responsible for tracking the mobile node’s movements to and from the access link and for signaling the mobile node’s local mobility anchor.

This document defines a set of managed objects (MOs) that can be used to monitor and control PMIPv6 entities.
2.2. Terminology

The terminology used in this document is consistent with the definitions used in the Mobile IPv6 protocol specification [RFC6275] and in the NETLMM goals document [RFC4831].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14, RFC 2119 [RFC2119].

3. Proxy Mobile IPv6 Monitoring and Control Requirements

For managing a PMIPv6 entity, it is necessary to monitor the following:

- capabilities of PMIPv6 entities
- signaling traffic due to PMIPv6 signaling
- binding-related details (at LMA and MAG)
- binding-related statistics (at LMA and MAG)

4. MIB Design

The basic principle has been to keep the MIB as simple as possible and, at the same time, to make it effective enough so that the essential needs of monitoring and control are met.

The Proxy Mobile IPv6 Management Information Base (PMIPv6-MIB) extends the Mobile IPv6 Management Information Base (MIPV6-MIB) [RFC4295]. It is assumed that PMIPv6-MIB will always be implemented in conjunction with the MOBILEIPV6-MIB [RFC4295]. The PMIPv6-MIB uses the textual conventions defined in the INET-ADDRESS-MIB [RFC4001] and IP-MIB [RFC4293].

The PMIPv6-MIB is composed of the following groups of definitions:

- pmip6Core: a generic group containing objects that are common to all the Proxy Mobile IPv6 entities. Objects belonging to this group will be implemented on the corresponding Proxy Mobile IPv6 entity. pmip6BindingCacheTable belongs to this group.

- pmip6Mag: this group models the mobile access gateway service. Objects belonging to this group have the "pmip6Mag" prefix and will be implemented on the corresponding MAG.

- pmip6Lma: this group models the local mobility anchor service. Objects belonging to this group have the "pmip6Lma" prefix and will be implemented on the corresponding LMA.
- pmip6Notifications: defines the set of notifications that will be used to asynchronously monitor the Proxy Mobile IPv6 entities.

The tables contained in the above groups are as follows:

- pmip6BindingCacheTable: models the Binding Cache on the local mobility anchor.

- pmip6MagProxyCOATable: models the Proxy Care-of Addresses configured on the egress interfaces of the mobile access gateway.

- pmip6MagMnIdentifierTable: provides a mapping from the MAG-internal pmip6MagMnIndex to the mobile node identifier.

- pmip6MagMnLLIdentifierTable: provides a mapping from the MAG-internal pmip6MagMnLLIndex to the corresponding interface of the mobile node link-layer identifier.

- pmip6MagHomeNetworkPrefixTable: contains the home network prefixes assigned to interfaces of all mobile nodes attached to the MAG. Each interface is distinguished by the attached mobile node identifier (MN-Identifier) and the link-layer identifier (MN-LL-Identifier).

- pmip6MagBLTable: models the Binding Update List (BL) that includes PMIPv6-related information and is maintained by the mobile access gateway.

- pmip6MagMnProfileTable: contains the mobile node’s policy profile that includes the essential operational parameters that are required by the network entities for managing the mobile node’s mobility service.

- pmip6LmaLMAATable: contains the LMA Addresses (LMAAs) that are configured on the local mobility anchor. Each LMA Address acts as a transport endpoint of the tunnel between the local mobility anchor and the mobile access gateway.

- pmip6LmaMnIdentifierTable: provides a mapping from the LMA-internal pmip6BindingMnIndex to the mobile node identifier.

- pmip6LmaMnLLIdentifierTable: provides a mapping from the LMA-internal pmip6BindingMnLLIndex to the corresponding interface of the mobile node link-layer identifier.
- pmip6LmaHomeNetworkPrefixTable: contains the list of home network prefixes assigned to the connected interfaces of the mobile nodes anchored on an LMA.

4.1. Textual Conventions

A Proxy Mobile IPv6 Textual Conventions MIB module containing Textual Conventions to represent commonly used Proxy Mobile IPv6 management information is defined. The intent is that these TEXTUAL CONVENTIONS (TCs) will be imported and used in PMIPv6-related MIB modules that would otherwise define their own representation(s). This MIB module includes references to RFC 4283 [RFC4283] and RFC 5213 [RFC5213].

5. MIB Definitions

5.1. Proxy Mobile IPv6 Textual Conventions MIB

PMIPv6-TC-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, mib-2, Unsigned32

FROM SNMPv2-SMI -- [RFC2578]

TEXTUAL-CONVENTION

FROM SNMPv2-TC; -- [RFC2579]

pmip6TCMIB MODULE-IDENTITY

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DESCRIPTION
"This MIB module provides textual conventions for Proxy Mobile IPv6 Management information.

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REVISION "201205070000Z" -- 7th May, 2012
DESCRIPTION
"The initial version, published as RFC 6475."
::= { mib-2 205 }

-- Textual Conventions

Pmip6TimeStamp64 ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "6d:2d"
   STATUS current
   DESCRIPTION
   "A 64-bit unsigned integer field containing a timestamp. The value indicates the elapsed time since January 1, 1970, 00:00 UTC, by using a fixed-point format. In this

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"
format, the integer number of seconds is contained in
the first 48 bits of the field, and the remaining 16
bits indicate the number of 1/65536 fractions of a
second.

REFERENCE
"RFC 5213: Section 8.8"
SYNTAX OCTET STRING (SIZE (8))

Pmip6MnIdentifier ::= TEXTUAL-CONVENTION
DISPLAY-HINT "255a"
STATUS current
DESCRIPTION
"The identity of a mobile node in the Proxy Mobile IPv6
domain. This is the stable identifier of a mobile node
that the mobility entities in a Proxy Mobile IPv6 domain
can always acquire and use for predictably identifying
a mobile node. Various forms of identifiers can be used
to identify a mobile node (MN). Two examples are a
Network Access Identifier (NAI) and an opaque
identifier applicable to a particular application."

REFERENCE
"RFC 4283: Section 3"
SYNTAX OCTET STRING (SIZE (0..255))
Pmip6MnLLIdentifier ::= TEXTUAL-CONVENTION
DISPLAY-HINT "255a"
STATUS current
DESCRIPTION
"An identifier that identifies the attached interface of
a mobile node."

REFERENCE
"RFC 5213: Section 8.6"
SYNTAX OCTET STRING (SIZE (0..255))
Pmip6MnIndex ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS current
DESCRIPTION
"A unique integer value, greater than zero, assigned to
each mobile node that is currently attached to the
Proxy Mobile IPv6 domain by the management system.
It is recommended that the values are assigned in a
monotonically increasing order starting from 1. It may
wrap after reaching its maximum value. The value for
each mobile node must remain constant at least from one
re-initialization of the entity’s network management
A unique integer value, greater than zero, assigned to each interface of a mobile node that is currently attached to the Proxy Mobile IPv6 domain by the management system. It is recommended that the values are assigned in a monotonically increasing order starting from 1. It may wrap after reaching its maximum value. The value for each interface of a mobile node must remain constant at least from one re-initialization of the entity’s network management system to the next re-initialization.

The object specifies the access technology that connects the mobile node to the access link on the mobile access gateway. The enumerated values and the corresponding access technology are as follows:

- reserved (0): Reserved (Not used)
- logicalNetworkInterface (1): Logical network interface
- pointToPointInterface (2): Point-to-point interface
- ethernet (3): Ethernet interface
- wirelessLan (4): Wireless LAN interface
- wimax (5): Wimax interface
- threeGPPGERAN (6): 3GPP GERAN
- threeGPPUTRAN (7): 3GPP UTRAN
- threeGPPEUTRAN (8): 3GPP E-UTRAN
- threeGPP2eHRPD (9): 3GPP2 eHRPD
- threeGPP2HRPD (10): 3GPP2 HRPD
- threeGPP21xRTT (11): 3GPP2 1xRTT
- threeGPP2UMB (12): 3GPP2 UMB

REFERENCE

"RFC 5213: Section 8.5, Mobile IPv6 parameters registry on http://www.iana.org/mobility-parameters"
reserved (0),
logicalNetworkInterface(1),
pointToPointInterface (2),
ethernet (3),
wirelessLan (4),
wimax (5),
threeGPPGERAN (6),
threeGPPUTRAN (7),
threeGPPUTRAN (8),
threeGPP2eHRPD (9),
threeGPP2HRPD (10),
threeGPP21xRTT (11),
threeGPP2UMB (12)

END

5.2. The Proxy Mobile IPv6 MIB

PMIPv6-MIB DEFINITIONS ::= BEGIN
IMPORTS
   MODULE-IDENTITY, mib-2, Integer32, Counter32, Gauge32,
   Unsigned32, OBJECT-TYPE, NOTIFICATION-TYPE
   FROM SNMPv2-SMI                   -- RFC 2578
   PhysAddress, TimeStamp,
   TruthValue
   FROM SNMPv2-TC                    -- RFC 2579
   MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
   FROM SNMPv2-CONF                  -- RFC 2580
   InetAddressType, InetAddress, InetAddressPrefixLength
   FROM INET-ADDRESS-MIB             -- RFC 4001
   Ipv6AddressIfIdentifierTC
   FROM IP-MIB                       -- RFC 4293
   mip6MnBEntry, mip6BindingCacheEntry
   FROM MOBILEIPV6-MIB               -- RFC 4295
   Pmip6TimeStamp64, Pmip6MnIdentifier,
   Pmip6MnLLIdentifier, Pmip6MnIndex, Pmip6MnLLIndex,
   Pmip6MnInterfaceATT
   FROM PMIPv6-TC-MIB                -- RFC 6475
;

pmip6MIB MODULE-IDENTITY
LAST-UPDATED "201205070000Z"       -- 7th May, 2012
ORGANIZATION "IETF NETLMM Working Group"
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DESCRIPTION

"The MIB module for monitoring and controlling PMIPv6 entities.

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DESCRIPTION "Initial version, published as RFC 6475."

::= { mib-2  206 }
-- The PMIPv6 MIB has the following 5 primary groups

pmip6Notifications OBJECT IDENTIFIER ::= { pmip6MIB 0 }

pmip6Objects OBJECT IDENTIFIER ::= { pmip6MIB 1 }

pmip6Conformance OBJECT IDENTIFIER ::= { pmip6MIB 2 }

pmip6Core OBJECT IDENTIFIER ::= { pmip6Objects 1 }

pmip6Mag OBJECT IDENTIFIER ::= { pmip6Objects 2 }

pmip6Lma OBJECT IDENTIFIER ::= { pmip6Objects 3 }

-- The sub groups

pmip6System OBJECT IDENTIFIER ::= { pmip6Core 1 }

pmip6Bindings OBJECT IDENTIFIER ::= { pmip6Core 2 }

pmip6Conf OBJECT IDENTIFIER ::= { pmip6Core 3 }

pmip6Stats OBJECT IDENTIFIER ::= { pmip6Core 4 }

pmip6MagSystem OBJECT IDENTIFIER ::= { pmip6Mag 1 }

pmip6MagConf OBJECT IDENTIFIER ::= { pmip6Mag 2 }

pmip6MagRegistration OBJECT IDENTIFIER ::= { pmip6Mag 3 }

pmip6LmaSystem OBJECT IDENTIFIER ::= { pmip6Lma 1 }

pmip6LmaConf OBJECT IDENTIFIER ::= { pmip6Lma 2 }

-- The pmip6Stats group has the following sub groups

pmip6BindingRegCounters OBJECT IDENTIFIER ::= { pmip6Stats 1 }

--

-- pmip6System group

--

pmip6Capabilities OBJECT-TYPE
SYNTAX BITS {
    mobilityAccessGateway (0),
    localMobilityAnchor (1)
}MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This object indicates the PMIPv6 functions that are supported by this managed entity. Multiple Proxy Mobile IPv6 functions may be supported by a single entity. mobilityAccessGateway(0) indicates the availability of the mobility access gateway function. localMobilityAnchor(1) indicates the availability of the local mobility anchor function."
pmip6MobileNodeGeneratedTimestampInUse OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"This flag indicates whether or not the
MN-generated timestamp mechanism is in use in that
Proxy Mobile IPv6 domain.
true(1) indicates that the local mobility anchors and
mobile access gateways in that Proxy Mobile IPv6
domain apply the MN-generated timestamp considerations.
false(0) indicates that the MN-generated timestamp
mechanism is not in use in that Proxy Mobile IPv6
domain.
The default value for this flag is 'false'."
REFERENCE
"RFC 5213: Sections 5.5, 9.3"
DEFVAL { false }
 ::= { pmip6Conf 1 }

pmip6FixedMagLinkLocalAddressOnAllAccessLinksType OBJECT-TYPE
SYNTAX      InetAddressType
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"The InetAddressType of the
pmip6FixedMagLinkLocalAddressOnAllAccessLinks
that follows.
"
 ::= { pmip6Conf 2 }

pmip6FixedMagLinkLocalAddressOnAllAccessLinks OBJECT-TYPE
SYNTAX      InetAddress
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
"This variable indicates the link-local address value
that all the mobile access gateways should use on
any of the access links shared with any of the
mobile nodes in that Proxy Mobile IPv6 domain. If
this variable is initialized with all zeroes, it
implies that the use of fixed link-local address mode
is not enabled for that Proxy Mobile IPv6 domain."
::= { pmip6Conf 3 }

pmip6FixedMagLinkLayerAddressOnAllAccessLinks OBJECT-TYPE
SYNTAX PhysAddress
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This variable indicates the link-layer address value that all the mobile access gateways should use on any of the access links shared with any of the mobile nodes in that Proxy Mobile IPv6 domain. For access technologies where there is no link-layer address, this variable MUST be initialized with all zeroes."

REFERENCE
"RFC 5213: Sections 2.2, 6.8, 6.9.1.1, 6.9.3, 9.3"

::= { pmip6Conf 4 }

pmip6MagStatus OBJECT-TYPE
SYNTAX INTEGER { enabled(1), disabled(2) }
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object indicates whether the PMIPv6 mobile access gateway function is enabled for the managed entity.

Changing the status from enabled(1) to disabled(2) will terminate the PMIPv6 mobile access gateway function. On the other hand, changing the status from disabled(2) to enabled(1) will start the PMIPv6 mobile access gateway function.

The value of this object MUST remain unchanged across reboots of the managed entity."

DEFVAL { disabled }

::= { pmip6MagSystem 1 }

pmip6MagProxyCOATable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6MagProxyCOAEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table models the Proxy Care-of Addresses configured on the egress interfaces of the mobile access gateway. This address is the transport endpoint of the
tunnel between the local mobility anchor and the mobile access gateway.

Entries in this table are not required to survive a reboot of the managed entity.

REFERENCE
"RFC 5213: Sections 2.2, 6.10"

::= { pmip6MagSystem 2 }

pmip6MagProxyCOAEntry  OBJECT-TYPE
SYNTAX      Pmip6MagProxyCOAEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"This entry represents a conceptual row in the Proxy-CoA table. It represents a Proxy Care-of Address on the mobile access gateway.

Implementers need to be aware that if the total number of octets in pmip6MagProxyCOA exceeds 113, then OIDs of column instances in this row will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c, or SNMPv3.

" INDEX  { pmip6MagProxyCOAType, pmip6MagProxyCOA }
 ::= { pmip6MagProxyCOATable 1 }

Pmip6MagProxyCOAEntry ::=  
  SEQUENCE { 
    pmip6MagProxyCOAType   InetAddressType,
    pmip6MagProxyCOA       InetAddress,
    pmip6MagProxyCOAState  INTEGER
  }

pmip6MagProxyCOAType  OBJECT-TYPE
SYNTAX      InetAddressType
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"The InetAddressType of the pmip6MagProxyCOA that follows.

"
 ::= { pmip6MagProxyCOAEntry 1 }

pmip6MagProxyCOA  OBJECT-TYPE
SYNTAX      InetAddress
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"The Proxy-CoA configured on the egress interface of the mobile access gateway.

The type of the address represented by this object is specified by the corresponding pmip6MagProxyCOAType object.
"

REFERENCE
"RFC 5213: Sections 2.2, 6.10"
::= { pmip6MagProxyCOAEntry 2 }

pmip6MagProxyCOAState OBJECT-TYPE
SYNTAX INTEGER {
    unknown(1),
    activated(2),
    tunneled(3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This object indicates the state of the Proxy-CoA:
unknown -- The state of the Proxy-CoA cannot be determined.
activated -- The Proxy-CoA is ready to establish a tunnel. This state SHOULD be indicated when the MAG is up but has no mobile node.
tunneled -- Bidirectional tunnel is established using the Proxy-CoA.
"
::= { pmip6MagProxyCOAEntry 3 }

pmip6MagEnableMagLocalRouting OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This flag indicates whether or not the mobile access gateway is allowed to enable local routing of the traffic exchanged between a visiting mobile node and a correspondent node that is locally connected to one of the interfaces of the mobile access gateway. The correspondent node can be another visiting mobile node as well, or a local fixed node.
true(1) indicates that the mobile access gateway routes the traffic locally.
fake(0) indicates that the mobile access gateway reverse tunnels all the traffic to the mobile node’s
local mobility anchor.

The default value for this flag is 'false'.

"RFC 5213: Section 9.2" DEFVAL { false }
::= { pmip6MagConf 1 }

pmip6MagMnIdentifierTable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6MagMnIdentifierEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A table containing the identifiers of mobile nodes attached to the MAG. Entries in this table are not required to survive a reboot of the managed entity."

"RFC 5213: Sections 2.2, 6.1"
::= { pmip6MagConf 2 }

pmip6MagMnIdentifierEntry OBJECT-TYPE
SYNTAX Pmip6MagMnIdentifierEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "An entry in the mobile node identifier table."

INDEX { pmip6MagBLMnIndex }
::= { pmip6MagMnIdentifierTable 1 }

Pmip6MagMnIdentifierEntry ::= SEQUENCE {
  pmip6MagMnIdentifier Pmip6MnIdentifier
}

pmip6MagMnIdentifier OBJECT-TYPE
SYNTAX Pmip6MnIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The identity of a mobile node in the Proxy Mobile IPv6 domain."

"RFC 5213: Sections 2.2, 6.1"
::= { pmip6MagMnIdentifierEntry 1 }

pmip6MagMnLLIdentifierTable OBJECT-TYPE
SYNTAX       SEQUENCE OF Pmip6MagMnLLIdentifierEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "A table containing the link-layer identifiers
 of the interfaces of the mobile nodes attached
to the MAG.
Entries in this table are not required to survive
a reboot of the managed entity.
"
REFERENCE
 "RFC 5213: Sections 2.2, 6.1"
::= { pmip6MagConf 3 }

pmip6MagMnLLIdentifierEntry OBJECT-TYPE
SYNTAX       Pmip6MagMnLLIdentifierEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "An entry in the mobile node link-layer identifier
 table.
"
INDEX { pmip6MagBLeMnIndex, pmip6MagBLeMnLLIndex }
::= { pmip6MagMnLLIdentifierTable 1 }

Pmip6MagMnLLIdentifierEntry ::= 
SEQUENCE {
   pmip6MagMnLLIdentifier  Pmip6MnLLIdentifier
}

pmip6MagMnLLIdentifier  OBJECT-TYPE
SYNTAX       Pmip6MnLLIdentifier
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
 "The link-layer identifier of the mobile node’s
 connected interface on the access link.
"
REFERENCE
 "RFC 5213: Sections 2.2, 6.1"
::= { pmip6MagMnLLIdentifierEntry 1 }

pmip6MagHomeNetworkPrefixTable OBJECT-TYPE
SYNTAX       SEQUENCE OF Pmip6MagHomeNetworkPrefixEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table representing the home network prefixes
assigned to the connected interfaces of mobile nodes
attached to the MAG.
"
REFERENCE
"RFC 5213: Sections 2, 6.1, 6.2"
::= { pmip6MagConf 4 }

pmip6MagHomeNetworkPrefixEntry OBJECT-TYPE
SYNTAX Pmip6MagHomeNetworkPrefixEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the home network prefixes table.
Implementers need to be aware that if the total
number of octets in pmip6MagHomeNetworkPrefix
exceeds 111, then OIDs of column instances in
this row will have more than 128 sub-identifiers
and cannot be accessed using SNMPv1, SNMPv2c, or
SNMPv3.
"
INDEX { pmip6MagBLMnIndex, pmip6MagBLMnLLIndex,
    pmip6MagHomeNetworkPrefixType,
    pmip6MagHomeNetworkPrefix } ::= { pmip6MagHomeNetworkPrefixTable 1 }

Pmip6MagHomeNetworkPrefixEntry ::= SEQUENCE {
    pmip6MagHomeNetworkPrefixType      InetAddressType,
    pmip6MagHomeNetworkPrefix          InetAddress,
    pmip6MagHomeNetworkPrefixLength    InetAddressPrefixLength,
    pmip6MagHomeNetworkPrefixLifeTime  Unsigned32
}

pmip6MagHomeNetworkPrefixType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The InetAddressType of the pmip6MagHomeNetworkPrefix
that follows.
"
::= { pmip6MagHomeNetworkPrefixEntry 1 }
pmip6MagHomeNetworkPrefix OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The mobile network prefix that is delegated to the mobile node. The type of the address represented by this object is specified by the corresponding pmip6MagHomeNetworkPrefixType object."
REFERENCE
"RFC 5213: Section 2"
 ::= { pmip6MagHomeNetworkPrefixEntry 2 }

pmip6MagHomeNetworkPrefixLength OBJECT-TYPE
SYNTAX InetAddressPrefixLength
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The prefix length of the home network prefix."
 ::= { pmip6MagHomeNetworkPrefixEntry 3 }

pmip6MagHomeNetworkPrefixLifeTime OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The lifetime parameter (in seconds) that will be advertised in Router Advertisements by the MAG for this home network prefix."
REFERENCE
"RFC 5213: Sections 6.2, 6.7"
 ::= { pmip6MagHomeNetworkPrefixEntry 4 }

pmip6MagBLTable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6MagBLEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table corresponds to the Binding Update List (BL) that includes PMIPv6-related information and is maintained by the mobile access gateway. Entries from the table are deleted as the lifetime of the binding expires."
REFERENCE
"RFC 6275: Sections 4.5, 11.1
RFC 5213: Section 6.1"
::= { pmip6MagRegistration 1 }
p mip6MagBLEntry OBJECT-TYPE
SYNTAX Pmip6MagBLEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry containing additional information from
a Binding Update sent by the mobile access gateway
to the local mobility anchor."
"
AUGMENTS {mip6MnBLEntry}
::= { pmip6MagBLTable 1 }

Pmip6MagBLEntry ::= SEQUENCE {
  pmip6MagBLFlag                    TruthValue,
  pmip6MagBLMnIndex                 Pmip6MnIndex,
  pmip6MagBLMnLLIndex               Pmip6MnLLIndex,
  pmip6MagBLMagLinkLocalAddressType InetAddressType,
  pmip6MagBLMagLinkLocalAddress     InetAddress,
  pmip6MagBLMagIfIdentifierToMn     Ipv6AddressIfIdentifierTC,
  pmip6MagBLTunnelIfIdentifier      Ipv6AddressIfIdentifierTC,
  pmip6MagBLMnInterfaceATT          Pmip6MnInterfaceATT,
  pmip6MagBLTimeRecentlyAccepted    Pmip6TimeStamp64
}

pmip6MagBLFlag OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"true(1) indicates that the mobile access gateway sent
the Proxy Binding Update with Proxy Registration Flag
that indicates to the local mobility anchor that the
registration is the Proxy Binding Update and is from a
mobile access gateway.
false(0) implies that the mobile access gateway is
behaving as a simple mobile node."
"
REFERENCE
"RFC 5213: Section 8.1"
::= { pmip6MagBLEntry 1 }

pmip6MagBLMnIndex OBJECT-TYPE
SYNTAX Pmip6MnIndex
MAX-ACCESS read-only
STATUS  current
DESCRIPTION  "The index to the identifier of the attached mobile
    node in the pmip6MagMnIdentifierTable.
"
REFERENCE  "RFC 5213: Sections 2.2, 6.1, 8.1"
::= { pmip6MagBLEntry 2 }

pmip6MagBLMnLLIndex OBJECT-TYPE
SYNTAX     Pmip6MnLLIndex
MAX-ACCESS read-only
STATUS      current
DESCRIPTION  "The index to the link-layer identifier of the mobile
    node's connected interface in the
    pmip6MagMnLLIdentifierTable.
"
REFERENCE  "RFC 5213: Sections 2.2, 6.1, 8.1"
::= { pmip6MagBLEntry 3 }

pmip6MagBLMagLinkLocalAddressType OBJECT-TYPE
SYNTAX     InetAddressType
MAX-ACCESS read-only
STATUS      current
DESCRIPTION  "The InetAddressType of the pmip6MagBLMagLinkLocalAddress
    that follows.
"
::= { pmip6MagBLEntry 4 }

pmip6MagBLMagLinkLocalAddress OBJECT-TYPE
SYNTAX     InetAddress
MAX-ACCESS read-only
STATUS      current
DESCRIPTION  "The link-local address of the mobile access gateway on
    the access link shared with the mobile node.
    This is the address that is present in the Link-local
    Address option of the corresponding Proxy Binding Update
    message.
"
REFERENCE  "RFC 3963: Sections 4.1, 5.1"
::= { pmip6MagBLEntry 5 }

pmip6MagBLMagIfIdentifierToMn OBJECT-TYPE
SYNTAX     Ipv6AddressIfIdentifierTC
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
 "The interface identifier (if-id) of the point-to-point
 link between the mobile node and the mobile access
gateway. This is internal to the mobile access gateway
and is used to associate the Proxy Mobile IPv6 tunnel
to the access link where the mobile node is attached.
"
REFERENCE
 "RFC 5213: Sections 6.1, 8.1"
::= { pmip6MagBLEntry 6 }

pmip6MagBLTunnelIfIdentifier OBJECT-TYPE
SYNTAX     Ipv6AddressIfIdentifierTC
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
 "The tunnel interface identifier (tunnel-if-id) of the
bidirectional tunnel between the mobile node’s local
mobility anchor and the mobile access gateway. This
is internal to the mobile access gateway. The tunnel
interface identifier is acquired during the tunnel
creation.
"
REFERENCE
 "RFC 5213: Sections 6.1, 8.1"
::= { pmip6MagBLEntry 7 }

pmip6MagBLMnInterfaceATT OBJECT-TYPE
SYNTAX      Pmip6MnInterfaceATT
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
 "The type of the access technology by which the mobile
node is currently attached to the mobile access gateway.
"
REFERENCE
 "RFC 5213: Sections 6.9.1.1, 6.9.1.5, 8.1"
::= { pmip6MagBLEntry 8 }

pmip6MagBLTimeRecentlyAccepted OBJECT-TYPE
SYNTAX      Pmip6TimeStamp64
MAX-ACCESS read-only
STATUS      current
DESCRIPTION
 "The 64-bit timestamp value of the most recently
accepted Proxy Binding Update message sent for this
mobile node. This is the time of day on the mobile access gateway, when the Proxy Binding Acknowledgement message with the Status field set to 0 was received. If the Timestamp option is not present in the Proxy Binding Update message (i.e., when the sequence-number-based scheme is in use), the value MUST be initialized with all zeroes.

REFERENCE
"RFC 5213: Sections 5.1, 8.1"
::= { pmip6MagBLEntry 9 }

pmip6MagMnProfileTable OBJECT-TYPE
SYNTAX    SEQUENCE OF Pmip6MagMnProfileEntry
MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION
"This table corresponds to the mobile node’s policy profile that includes the essential operational parameters that are required by the network entities for managing the mobile node’s mobility service. It contains policy profiles of mobile nodes that are connected to the mobile access gateway. Entries in this table are not required to survive a reboot of the managed entity."

REFERENCE
"RFC 5213: Section 6.2"
::= { pmip6MagRegistration 2 }

Pmip6MagMnProfileEntry OBJECT-TYPE
SYNTAX    Pmip6MagMnProfileEntry
MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION
"An entry containing information about the mobile node’s policy profile."

INDEX { pmip6MagProfMnIndex }
::= { pmip6MagMnProfileTable 1 }

Pmip6MagMnProfileEntry ::= SEQUENCE {
      pmip6MagProfMnIndex                Pmip6MnIndex,
      pmip6MagProfMnIdentifier           Pmip6MnIdentifier,
      pmip6MagProfMnLocalMobilityAnchorAddressType
                                           InetSocketAddress,
      pmip6MagProfMnLocalMobilityAnchorAddress InetSocketAddress
}
pmip6MagProfMnIndex OBJECT-TYPE
SYNTAX Pmip6MnIndex
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The index for a mobile node in the Proxy Mobile IPv6 domain.
"
::= { pmip6MagMnProfileEntry 1 }

pmip6MagProfMnIdentifier OBJECT-TYPE
SYNTAX Pmip6MnIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The identity of a mobile node in the Proxy Mobile IPv6 domain.
"
REFERENCE
"RFC 5213: Section 2.2"
::= { pmip6MagMnProfileEntry 2 }

pmip6MagProfMnLocalMobilityAnchorAddressType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The InetAddressType of the pmip6MagMnLocalMobilityAnchorAddress that follows.
"
::= { pmip6MagMnProfileEntry 3 }

pmip6MagProfMnLocalMobilityAnchorAddress OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The global address that is configured on the interface of the local mobility anchor and is the transport endpoint of the bidirectional tunnel established between the local mobility anchor and the mobile access gateway. This is the address to which the mobile access gateway sends the Proxy Binding Update messages.
"
REFERENCE
"RFC 5213: Section 2.2"
::= { pmip6MagMnProfileEntry 4 }
pmip6BindingCacheTable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6BindingCacheEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table models the Binding Cache on the local mobility anchor.
Entries from the table are deleted as the lifetime of the binding expires.
Entries in this table are not required to survive a reboot of the managed entity."

REFERENCE
"RFC 6275: Sections 4.5, 9.1, 10.1
RFC 5213: Section 5.1"
::= { pmip6Bindings 1 }

pmip6BindingCacheEntry OBJECT-TYPE
SYNTAX Pmip6BindingCacheEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry containing additional information contained in the Binding Cache table of the local mobility anchor."

AUGMENTS {mip6BindingCacheEntry}
::= { pmip6BindingCacheTable 1 }

Pmip6BindingCacheEntry ::= SEQUENCE {
  pmip6BindingPBUFlag                 TruthValue,
  pmip6BindingMnIndex                 Pmip6MnIndex,
  pmip6BindingMnLLIndex               Pmip6MnLLIndex,
  pmip6BindingMagLinkLocalAddressType InetAddressType,
  pmip6BindingMagLinkLocalAddress     InetAddress,
  pmip6BindingTunnelIfIdentifier    Ipv6AddressIfIdentifierTC,
  pmip6BindingMnInterfaceATT
                                Pmip6MnInterfaceATT,
  pmip6BindingTimeRecentlyAccepted     Pmip6TimeStamp64
}

pmip6BindingPBUFlag OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"true(1) indicates that the local mobility anchor
accepted the binding update with Proxy Registration Flag from a mobile access gateway. false(0) implies that the binding cache is from a mobile node. In this case, the remaining objects will not be accessible.

REFERENCE
"RFC 5213: Sections 5.1, 8.1"
::= { pmip6BindingCacheEntry 1 }

pmip6BindingMnIndex OBJECT-TYPE
SYNTAX Pmip6MnIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An index to the identifier of the registered mobile node."

REFERENCE
"RFC 5213: Sections 2.2, 5.1, 8.1
RFC 4283: Section 3"
::= { pmip6BindingCacheEntry 2 }

pmip6BindingMnLLIndex OBJECT-TYPE
SYNTAX Pmip6MnLLIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The index to the link-layer identifier of the mobile node’s connected interface on the access link."

REFERENCE
"RFC 5213: Sections 2.2, 5.1, 8.1"
::= { pmip6BindingCacheEntry 3 }

pmip6BindingMagLinkLocalAddressType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The InetAddressType of the pmip6BindingMagLinkLocalAddress that follows."

::= { pmip6BindingCacheEntry 4 }

pmip6BindingMagLinkLocalAddress OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
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DESCRIPTION

"The link-local address of the mobile access gateway on
the point-to-point link shared with the mobile node.
This is generated by the local mobility anchor after
accepting the initial Proxy Binding Update message.
This is the address that is present in the Link-local
Address option of the corresponding Proxy Binding
Acknowledgement message.
"

REFERENCE

"RFC 5213: Sections 5.1, 6.9.1.2, 8.2"
::= { pmip6BindingCacheEntry 5 }

pmip6BindingTunnelIfIdentifier OBJECT-TYPE
SYNTAX      Ipv6AddressIfIdentifierTC
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION

"The tunnel interface identifier (tunnel-if-id) of the
bidirectional tunnel between the local mobility anchor
and the mobile access gateway where the mobile node is
currently anchored. This is internal to the local
mobility anchor. The tunnel interface identifier is
acquired during the tunnel creation.
"

REFERENCE

"RFC 5213: Sections 5.1, 8.1"
::= { pmip6BindingCacheEntry 6 }

pmip6BindingMnInterfaceATT OBJECT-TYPE
SYNTAX      Pmip6MnInterfaceATT
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION

"The access technology type by which the mobile node
is currently attached. This is obtained from the
Access Technology Type option, present in the Proxy
Binding Update message.
"

REFERENCE

"RFC 5213: Sections 5.1, 8.1"
::= { pmip6BindingCacheEntry 7 }

pmip6BindingTimeRecentlyAccepted OBJECT-TYPE
SYNTAX      Pmip6TimeStamp64
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION


"The 64-bit timestamp value of the most recently accepted Proxy Binding Update message sent for this mobile node. This is the time of day on the local mobility anchor, when the message was received. If the Timestamp option is not present in the Proxy Binding Update message (i.e., when the sequence number based scheme is in use), the value MUST be initialized with all zeroes.

REFERENCE

"RFC 5213: Sections 5.1, 8.1"

::= { pmip6BindingCacheEntry 8 }

--

--- pmip6Stats group
---

-- pmip6Stats:pmip6BindingRegCounters
--

pmip6MissingMnIdentifierOption OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Missing mobile node identifier option' (Code 160).

Discontinuities in the value of this counter can occur at re-initialization of the mobile router, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

"REFERENCE

"RFC 5213: Sections 5.3.1, 8.9"

::= { pmip6BindingRegCounters 1 }

pmip6MagNotAuthorizedForProxyReg OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages
rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Not authorized to send Proxy Binding Updates' (Code 154).

Discontinuities in the value of this counter can occur at re-initialization of the mobile router, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.3.1, 8.9"
::= { pmip6BindingRegCounters 2 }

pmip6NotLMAForThisMobileNode  OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Not local mobility anchor for this mobile node' (Code 153).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.3.1, 8.9"
::= { pmip6BindingRegCounters 3 }

pmip6ProxyRegNotEnabled  OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Proxy Registration not enabled' (Code 152). Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.3.1, 8.9"
REFERENCE

"RFC 5213: Sections 5.3.1, 6.9.1.2, 8.9"
::= { pmip6BindingRegCounters 4 }

pmip6MissingHomeNetworkPrefixOption OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Missing home network prefix option' (Code 158). Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime."

REFERENCE

"RFC 5213: Sections 5.3.1, 8.9"
::= { pmip6BindingRegCounters 5 }

pmip6MissingHandOffIndicatorOption OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Missing handoff indicator option' (Code 161). Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime."

REFERENCE

"RFC 5213: Sections 5.3.1, 8.9"
::= { pmip6BindingRegCounters 6 }

pmip6MissingAccessTechTypeOption OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Missing access technology type option’ (Code 162)."
Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.3.1, 8.9"
::= { pmip6BindingRegCounters 7 }

pmip6NotAuthorizedForHomeNetworkPrefix OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Mobile node not authorized for one or more of the requesting home network prefixes' (Code 155).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.3.2, 6.9.1.2, 8.9"
::= { pmip6BindingRegCounters 8 }

pmip6TimestampMismatch OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'Invalid timestamp value (the clocks are out of sync)' (Code 156).
Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.5, 6.9.1.2, 8.9"
::= { pmip6BindingRegCounters 9 }
pmip6TimestampLowerThanPrevAccepted OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'The timestamp value is lower than the previously accepted value' (Code 157). Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime."

REFERENCE
"RFC 5213: Sections 5.5, 6.9.1.2, 8.9"
 ::= { pmip6BindingRegCounters 10 }

pmip6BcePbuPrefixSetDoNotMatch OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages rejected by the local mobility anchor with status code in the Binding Acknowledgement message indicating 'All the home network prefixes listed in the Binding Cache entry do not match all the prefixes in the received Proxy Binding Update' (Code 159). Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime."

REFERENCE
"RFC 5213: Sections 5.4.1.1, 8.9"
 ::= { pmip6BindingRegCounters 11 }

pmip6InitialBindingRegistrations OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Total number of Proxy Binding Update messages that newly creates the Binding Cache entry. Discontinuities in the value of this counter can occur at re-initialization of the management system,
and at other times as indicated by the value of pmip6CounterDiscontinuityTime.

REFERENCE
"RFC 5213: Sections 5.3.2"
::= { pmip6BindingRegCounters 12 }

pmip6BindingLifeTimeExtensionNoHandOff OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages for extending the binding lifetime, received from the same mobile access gateway that last updated the binding. Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime."

REFERENCE
"RFC 5213: Sections 5.3.3"
::= { pmip6BindingRegCounters 13 }

pmip6BindingLifeTimeExtensionAfterHandOff OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages for extending the binding lifetime, received from a new mobile access gateway where the mobile node’s mobility session is handed off. Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of pmip6CounterDiscontinuityTime."

REFERENCE
"RFC 5213: Sections 5.3.4"
::= { pmip6BindingRegCounters 14 }

pmip6BindingDeRegistrations OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Update messages with
the lifetime value of zero.
Discontinuities in the value of this counter can
occur at re-initialization of the management system,
and at other times as indicated by the value of
pmip6CounterDiscontinuityTime.
"

REFERENCE
"RFC 5213: Sections 5.3.5"
::= { pmip6BindingRegCounters 15 }

pmip6BindingBindingAcks OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Total number of Proxy Binding Acknowledgement
messages.
Discontinuities in the value of this counter can
occur at re-initialization of the management system,
and at other times as indicated by the value of
pmip6CounterDiscontinuityTime.
"

REFERENCE
"RFC 5213: Sections 5.3.5"
::= { pmip6BindingRegCounters 16 }

pmip6CounterDiscontinuityTime OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of sysUpTime on the most recent occasion
at which any one or more of this PMIPv6 entity’s
global counters, viz., counters with OID prefix
‘pmip6BindingRegCounters’ suffered a discontinuity.
If no such discontinuities have occurred since the
last re-initialization of the local management
subsystem, then this object will have a zero value.
"
::= { pmip6BindingRegCounters 17 }

pmip6LmaStatus OBJECT-TYPE
SYNTAX INTEGER { enabled(1), disabled(2) }
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object indicates whether the PMIPv6 local
mobility anchor function is enabled for the managed entity.

Changing the status from enabled(1) to disabled(2) will terminate the PMIPv6 local mobility anchor function. On the other hand, changing the status from disabled(2) to enabled(1) will start the PMIPv6 local mobility anchor function.

The value of this object MUST remain unchanged across reboots of the managed entity.

"DEFVAL { disabled }
::= { pmip6LmaSystem 1 }

pmip6LmaLMAATable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6LmaLMAAEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This table models the LMA Addresses configured on the local mobility anchor. Each LMA Address acts as a transport endpoint of the tunnel between the local mobility anchor and the mobile access gateway and is the transport endpoint of the tunnel between the local mobility anchor and the mobile access gateway.

Entries in this table are not required to survive a reboot of the managed entity.

"REFERENCE
"RFC 5213: Sections 2.2, 5.6"
::= { pmip6LmaSystem 2 }

pmip6LmaLMAAEntry OBJECT-TYPE
SYNTAX Pmip6LmaLMAAEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This entry represents a conceptual row in the LMAA table. It represents each LMAA on the local mobility anchor.

Implementers need to be aware that if the total number of octets in pmip6LmaLMAA exceeds 113, then OIDs of column instances in this row will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c, or SNMPv3.
INDEX { pmip6LmaLMAAType, pmip6LmaLMAA } ::= { pmip6LmaLMAATable 1 }

Pmip6LmaLMAAEntry ::= SEQUENCE {
  pmip6LmaLMAAType InetAddressType,
  pmip6LmaLMAA InetAddress,
  pmip6LmaLMAAState INTEGER
}

pmip6LmaLMAAType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The InetAddressType of the pmip6LmaLMAA that follows."
 ::= { pmip6LmaLMAAEntry 1 }

pmip6LmaLMAA OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The LMAA configured on the local mobility anchor.
The type of the address represented by this object is specified by the corresponding pmip6LmaLMAAType object."
REFERENCE "RFC 5213: Sections 2.2, 5.6"
 ::= { pmip6LmaLMAAEntry 2 }

pmip6LmaLMAAState OBJECT-TYPE
SYNTAX INTEGER {
  unknown(1),
  activated(2),
  tunneled(3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION "This object indicates the state of the LMAA:
unknown -- The state of the LMAA cannot be determined."
activated -- The LMAA is ready to establish a tunnel.

tunneled -- The LMAA is used to set up the bidirectional tunnel.

::= { pmip6LmaLMAAEntry 3 }

pmip6LmaMinDelayBeforeBCEDelete OBJECT-TYPE
SYNTAX Integer32 (1..65535)
UNITS "milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This variable specifies the length of time in milliseconds the local mobility anchor MUST wait before it deletes a Binding Cache entry of a mobile node, upon receiving a Proxy Binding Update message from a mobile access gateway with a lifetime value of 0. During this wait time, if the local mobility anchor receives a Proxy Binding Update for the same mobility binding, with a lifetime value greater than 0, then it must update the Binding Cache entry with the accepted binding values. By the end of this wait time, if the local mobility anchor did not receive any valid Proxy Binding Update message for that mobility binding, it MUST delete the Binding Cache entry. This delay essentially ensures that a mobile node's Binding Cache entry is not deleted too quickly and allows some time for the new mobile access gateway to complete the signaling for the mobile node. The default value for this variable is 10000 milliseconds."

REFERENCE
"RFC 5213: Sections 5.3.5, 9.1"
DEFVAL { 10000 }
::= { pmip6LmaConf 1 }

pmip6LmaMaxDelayBeforeNewBCEAssign OBJECT-TYPE
SYNTAX Integer32 (1..65535)
UNITS "milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This variable specifies the length of time in milliseconds the local mobility anchor MUST wait for the de-registration message for an existing mobility session before it decides to create a new mobility
The default value for this variable is 1500 milliseconds. Note that there is a dependency between this value and the values used in the retransmission algorithm for Proxy Binding Updates. The retransmissions need to happen before MaxDelayBeforeNewBCEAssign runs out, as otherwise there are situations where a de-registration from a previous mobile access gateway may be lost, and the local mobility anchor creates, needlessly, a new mobility session and new prefixes for the mobile node. However, this affects situations where there is no information from the lower layers about the type of a handoff or other parameters that can be used for identifying the mobility session.

REFERENCE
"RFC 5213: Sections 5.4.1.2, 5.4.1.3, 9.1"
DEFVAL { 1500 }
::= { pmip6LmaConf 2 }

pmip6LmaTimestampValidityWindow OBJECT-TYPE
SYNTAX Integer32 (1..65535)
UNITS "milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This variable specifies the maximum length of time difference in milliseconds between the timestamp in the received Proxy Binding Update message and the current time of day on the local mobility anchor that is allowed by the local mobility anchor for the received message to be considered valid.
The default value for this variable is 300 milliseconds. This variable must be adjusted to suit the deployments."

REFERENCE
"RFC 5213: Sections 5.5, 9.1"
DEFVAL { 300 }
::= { pmip6LmaConf 3 }

pmip6LmaMnIdentifierTable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6LmaMnIdentifierEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table containing the identifiers of mobile nodes served by the LMA."
Entries in this table are not required to survive a reboot of the managed entity.

REFERENCE
"RFC 5213: Sections 2, 6.1"
::= { pmip6LmaConf 4 }

pmip6LmaMnIdentifierEntry OBJECT-TYPE
SYNTAX Pmip6LmaMnIdentifierEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the mobile node identifier table."

INDEX { pmip6BindingMnIndex
    }
::= { pmip6LmaMnIdentifierTable 1 }

Pmip6LmaMnIdentifierEntry ::= SEQUENCE {
    pmip6LmaMnIdentifier Pmip6MnIdentifier
}

pmip6LmaMnIdentifier OBJECT-TYPE
SYNTAX Pmip6MnIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The identity of a mobile node in the Proxy Mobile IPv6 domain."

REFERENCE
"RFC 5213: Section 2.2"
::= { pmip6LmaMnIdentifierEntry 1 }

pmip6LmaMnLLIdentifierTable OBJECT-TYPE
SYNTAX SEQUENCE OF Pmip6LmaMnLLIdentifierEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A table containing the link-layer identifiers of the interfaces of the mobile nodes served by the LMA. Entries in this table are not required to survive a reboot of the managed entity."

REFERENCE
"RFC 5213: Sections 2, 6.1"
::= { pmip6LmaConf 5 }

pmip6LmaMnLLIdentifierEntry OBJECT-TYPE
SYNTAX      Pmip6LmaMnLLIdentifierEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "An entry in the mobile node link-layer identifier table."
INDEX  { pmip6BindingMnIndex, pmip6BindingMnLLIndex }
 ::= { pmip6LmaMnLLIdentifierTable 1 }

Pmip6LmaMnLLIdentifierEntry ::= SEQUENCE {
    pmip6LmaMnLLIdentifier      Pmip6MnLLIdentifier
}

pmip6LmaMnLLIdentifier  OBJECT-TYPE
SYNTAX      Pmip6MnLLIdentifier
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
 "The link-layer identifier of the mobile node’s connected interface on the access link."
 ::= { pmip6LmaMnLLIdentifierEntry 1 }

pmip6LmaHomeNetworkPrefixTable   OBJECT-TYPE
SYNTAX      SEQUENCE OF Pmip6LmaHomeNetworkPrefixEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "A table representing the home network prefixes assigned to the connected interfaces of all the mobile nodes anchored at the LMA."
REFERENCE
 "RFC 5213: Sections 2, 5.1, 5.2"
 ::= { pmip6LmaConf 6 }

pmip6LmaHomeNetworkPrefixEntry OBJECT-TYPE
SYNTAX      Pmip6LmaHomeNetworkPrefixEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
 "An entry in the home network prefixes table."
Implementers need to be aware that if the total number of octets in pmip6LmaHomeNetworkPrefix exceeds 111 then OIDs of column instances in this row will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c, or SNMPv3.

```
INDEX  { pmip6BindingMnIndex, pmip6BindingMnLLIndex,
    pmip6LmaHomeNetworkPrefixType,
    pmip6LmaHomeNetworkPrefix } ::= { pmip6LmaHomeNetworkPrefixTable 1 }
```

```
Pmip6LmaHomeNetworkPrefixEntry ::= SEQUENCE {
    pmip6LmaHomeNetworkPrefixType  InetAddressType,
    pmip6LmaHomeNetworkPrefix     InetAddress,
    pmip6LmaHomeNetworkPrefixLength InetAddressPrefixLength,
    pmip6LmaHomeNetworkPrefixLifeTime Gauge32
}
```

```
pmip6LmaHomeNetworkPrefixType OBJECT-TYPE
SYNTAX    InetAddressType
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
   "The InetAddressType of the pmip6LmaHomeNetworkPrefix that follows."
   
 ::= { pmip6LmaHomeNetworkPrefixEntry 1 }
```

```
pmip6LmaHomeNetworkPrefix OBJECT-TYPE
SYNTAX    InetAddress
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
   "The mobile network prefix that is delegated to the mobile node. The type of the address represented by this object is specified by the corresponding pmip6LmaHomeNetworkPrefixType object."
   
REFERENCE
   "RFC 5213: Section 2"
```

```
pmip6LmaHomeNetworkPrefixLength OBJECT-TYPE
SYNTAX    InetAddressPrefixLength
MAX-ACCESS read-only
```
STATUS current
DESCRIPTION "The prefix length of the home network prefix."
 ::= { pmip6LmaHomeNetworkPrefixEntry 3 }

pmip6LmaHomeNetworkPrefixLifeTime OBJECT-TYPE
SYNTAX Gauge32
UNITS "seconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The lifetime (in seconds) granted to the mobile node for this registration."
REFERENCE "RFC 5213: Section 5.3"
 ::= { pmip6LmaHomeNetworkPrefixEntry 4 }

-- -- pmip6Notifications -- --

pmip6MagHomeTunnelEstablished NOTIFICATION-TYPE
OBJECTS [
    pmip6MagBLTunnelIfIdentifier,
    pmip6MagProxyCOAState
]
STATUS current
DESCRIPTION "This notification is sent by the Proxy Mobile IPv6 entities every time the tunnel is established between the local mobility anchor and mobile access gateway."
REFERENCE "RFC 5213: Section 5.6.1"
 ::= { pmip6Notifications 1 }

pmip6MagHomeTunnelReleased NOTIFICATION-TYPE
OBJECTS [
    pmip6MagBLTunnelIfIdentifier,
    pmip6MagProxyCOAState
]
STATUS current
DESCRIPTION "This notification is sent by the Proxy Mobile IPv6 entities every time the tunnel between the local
mobility anchor and mobile access gateway is released.

REFERENCE
"RFC 5213: Section 5.6.1"
::= { pmip6Notifications 2}

pmip6LmaHomeTunnelEstablished NOTIFICATION-TYPE
OBJECTS
  { pmip6BindingTunnelIfIdentifier, pmip6LmaLMAAState }
STATUS current
DESCRIPTION
"This notification is sent by the Proxy Mobile IPv6 entities every time the tunnel is established between the local mobility anchor and mobile access gateway."

REFERENCE
"RFC 5213: Section 5.6.1"
::= { pmip6Notifications 3 }

pmip6LmaHomeTunnelReleased NOTIFICATION-TYPE
OBJECTS
  { pmip6BindingTunnelIfIdentifier, pmip6LmaLMAAState }
STATUS current
DESCRIPTION
"This notification is sent by the Proxy Mobile IPv6 entities every time the tunnel between the local mobility anchor and mobile access gateway is released."

REFERENCE
"RFC 5213: Section 5.6.1"
::= { pmip6Notifications 4}

-- Conformance information
pmip6Groups OBJECT IDENTIFIER ::= { pmip6Conformance 1 }

pmip6Compliances OBJECT IDENTIFIER ::= { pmip6Conformance 2 }

-- Units of conformance
pmip6SystemGroup OBJECT-GROUP
OBJECTS
  { pmip6Capabilities, pmip6MobileNodeGeneratedTimestampInUse, pmip6FixedMagLinkLocalAddressOnAllAccessLinksType, pmip6FixedMagLinkLocalAddressOnAllAccessLinks, pmip6FixedMagLinkLayerAddressOnAllAccessLinks, ...}
pmip6BindingCacheGroup   OBJECT-GROUP
OBJECTS {
    pmip6BindingPBUFlag,
    pmip6BindingMnIndex,
    pmip6BindingMnLLIndex,
    pmip6BindingMagLinkLocalAddressType,
    pmip6BindingMagLinkLocalAddress,
    pmip6BindingTunnelIfIdentifier,
    pmip6BindingMnInterfaceATT,
    pmip6BindingTimeRecentlyAccepted,
    pmip6LmaMnIdentifier,
    pmip6LmaMnLLIdentifier
}
STATUS  current
DESCRIPTION
   " A collection of objects for monitoring the PMIPv6 extensions of the Binding Cache."
::= { pmip6Groups 2 }

pmip6StatsGroup   OBJECT-GROUP
OBJECTS {
    pmip6MissingMnIdentifierOption,
    pmip6MagNotAuthorizedForProxyReg,
    pmip6NotLMAForThisMobileNode,
    pmip6ProxyRegNotEnabled,
    pmip6MissingHomeNetworkPrefixOption,
    pmip6MissingHandOffIndicatorOption,
    pmip6MissingAccessTechTypeOption,
    pmip6NotAuthorizedForHomeNetworkPrefix,
    pmip6TimestampMismatch,
    pmip6TimestampLowerThanPrevAccepted,
    pmip6BcePbuPrefixSetDoNotMatch,
    pmip6InitialBindingRegistrations,
    pmip6BindingLifeTimeExtensionNoHandOff,
    pmip6BindingLifeTimeExtensionAfterHandOff,
    pmip6BindingDeRegistrations,
    pmip6BindingBindingAcks,
    pmip6CounterDiscontinuityTime
}
STATUS  current
DESCRIPTION
   " A collection of objects for basic PMIPv6 monitoring."
::= { pmip6Groups 1 }
" A collection of objects for basic PMIPv6 statistics monitoring. 
": 3

pmip6MagSystemGroup OBJECT-GROUP
OBJECTS {
  pmip6MagStatus,
  pmip6MagProxyCOAState
}
STATUS current
DESCRIPTION
" A collection of objects for monitoring the PMIPv6-system-related objects on a mobile router."
": 4

pmip6MagConfigurationGroup OBJECT-GROUP
OBJECTS {
  pmip6MagHomeNetworkPrefixLength,
  pmip6MagHomeNetworkPrefixLifeTime,
  pmip6MagEnableMagLocalRouting
}
STATUS current
DESCRIPTION
" A collection of objects for monitoring the configuration-related objects on a mobile access gateway."
": 5

pmip6MagRegistrationGroup OBJECT-GROUP
OBJECTS {
  pmip6MagBLFlag,
  pmip6MagBLMnIndex,
  pmip6MagBLMnLLIndex,
  pmip6MagBLMagLinkLocalAddressType,
  pmip6MagBLMagLinkLocalAddress,
  pmip6MagBLMagIfIdentifierToMn,
  pmip6MagBLTunnelIfIdentifier,
  pmip6MagBLMnInterfaceATT,
  pmip6MagBLTimeRecentlyAccepted,
  pmip6MagMnIdentifier,
  pmip6MagMnLLIdentifier,
  pmip6MagProfMnIdentifier,
  pmip6MagProfMnLocalMobilityAnchorAddressType,
  pmip6MagProfMnLocalMobilityAnchorAddress
}
STATUS current
DESCRIPTION
" A collection of objects for monitoring the registration-related objects on a mobile access gateway.
" ::= { pmip6Groups 6 }

pmip6LmaSystemGroup OBJECT-GROUP
OBJECTS {
   pmip6LmaStatus,
   pmip6LmaLMAAState
}
STATUS current
DESCRIPTION
" A collection of objects for monitoring the system-related objects on an LMA."
 ::= { pmip6Groups 7 }

pmip6LmaConfigurationGroup OBJECT-GROUP
OBJECTS {
   pmip6LmaMinDelayBeforeBCEDelete,
   pmip6LmaMaxDelayBeforeNewBCEAssign,
   pmip6LmaTimestampValidityWindow,
   pmip6LmaHomeNetworkPrefixLength,
   pmip6LmaHomeNetworkPrefixLifeTime
}
STATUS current
DESCRIPTION
" A collection of objects for Monitoring the configuration-related objects on an LMA."
 ::= { pmip6Groups 8 }

pmip6MagNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS {
   pmip6MagHomeTunnelEstablished,
   pmip6MagHomeTunnelReleased
}
STATUS current
DESCRIPTION
"A collection of notifications from a home agent or correspondent node to the Manager about the tunnel status of the mobile router."
 ::= { pmip6Groups 9 }

pmip6LmaNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS {
   pmip6LmaHomeTunnelEstablished,
   pmip6LmaHomeTunnelReleased
}
status current

DESCRIPTION
    "A collection of notifications from a home agent
    or correspondent node to the Manager about the
    tunnel status of the mobile router."

::= { pmip6Groups 10 }

-- Compliance statements

pmip6CoreCompliance MODULE-COMPLIANCE
    status current
    description
    "The compliance statement for SNMP entities
    that implement the PMIPv6-MIB.
    There are a number of INDEX objects that cannot be
    represented in the form of OBJECT clauses in
    SMIv2, but for which there are compliance
    requirements, expressed in OBJECT clause form in
    this description:
    -- OBJECT pmip6BindingHomeAddressType
    -- SYNTAX    InetAddressType { ipv6(2) }
    -- DESCRIPTION
    --    This MIB module requires support for global
    --    ipv6 addresses for the pmip6BindingHomeAddress
    --    object.
    --
    
    module -- this module
    mandatory-groups { pmip6SystemGroup }

::= { pmip6Compliances 1 }

pmip6Compliance2 MODULE-COMPLIANCE
    status current
    description
    "The compliance statement for SNMP entities
    that implement the PMIPv6-MIB."

module -- this module
    mandatory-groups { pmip6SystemGroup,
                      pmip6BindingCacheGroup,
                      pmip6StatsGroup }

::= { pmip6Compliances 2 }

pmip6CoreReadOnlyCompliance MODULE-COMPLIANCE
    status current
DESCRIPTION
"The compliance statement for SNMP entities
that implement the PMIPv6-MIB without support
for read-write (i.e., in read-only mode).
"

MODULE -- this module
MANDATORY-GROUPS { pmip6SystemGroup
}

OBJECT  pmip6MobileNodeGeneratedTimestampInUse
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6FixedMagLinkLocalAddressOnAllAccessLinksType
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6FixedMagLinkLocalAddressOnAllAccessLinks
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6FixedMagLinkLayerAddressOnAllAccessLinks
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

::= { pmip6Compliances 3 }

pmip6ReadOnlyCompliance2 MODULE-COMPLIANCE
STATUS  current
DESCRIPTION
"The compliance statement for SNMP entities
that implement the PMIPv6-MIB without support
for read-write (i.e., in read-only mode).
"

MODULE -- this module
MANDATORY-GROUPS { pmip6SystemGroup,
                     pmip6BindingCacheGroup,
                     pmip6StatsGroup
}

OBJECT  pmip6MobileNodeGeneratedTimestampInUse
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6FixedMagLinkLocalAddressOnAllAccessLinksType
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6FixedMagLinkLocalAddressOnAllAccessLinks
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6FixedMagLinkLayerAddressOnAllAccessLinks
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."
OBJECT pmip6FixedMagLinkLayerAddressOnAllAccessLinks
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."
::= { pmip6Compliances 4 }

pmip6MagCoreCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement for SNMP entities that implement the PMIPV6-MIB.

There are a number of INDEX objects that cannot be represented in the form of OBJECT clauses in SMIv2, but for which there are compliance requirements, expressed in OBJECT clause form in this description:
-- OBJECT pmip6MagProxyCOAType
-- SYNTAX InetAddressType { ipv6(2) }
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6MagProxyCOAType object.
--
-- OBJECT pmip6MagProxyCOA
-- SYNTAX InetAddress (SIZE(16))
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6MagProxyCOA object.
--
"

MODULE -- this module
MANDATORY-GROUPS { pmip6MagSystemGroup }
::= { pmip6Compliances 5 }

pmip6MagCompliance2 MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement for SNMP entities that implement the PMIPV6-MIB for monitoring configuration-related information, registration details, and statistics on a mobile access gateway."
There are a number of INDEX objects that cannot be represented in the form of OBJECT clauses in SMIv2, but for which there are compliance requirements, expressed in OBJECT clause form in this description:

-- OBJECT pmip6MagProxyCOAType
-- SYNTAX InetAddressType { ipv6(2) }
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6MagProxyCOA object.
--
-- OBJECT pmip6MagProxyCOA
-- SYNTAX InetAddress (SIZE(16))
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6MagProxyCOAType object.
--
-- OBJECT pmip6MagHomeNetworkPrefixType
-- SYNTAX InetAddressType { ipv6(2) }
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6MagHomeNetworkPrefix object.
--
-- OBJECT pmip6MagHomeNetworkPrefix
-- SYNTAX InetAddress (SIZE(16))
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6MagHomeNetworkPrefix object.
--

""

MODULE -- this module
MANDATORY-GROUPS { pmip6MagSystemGroup,
                        pmip6MagConfigurationGroup,
                        pmip6MagRegistrationGroup
            }
::= { pmip6Compliances 6 }

pmip6MagCoreReadOnlyCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement for SNMP entities that implement the PMIPv6-MIB without support for read-write (i.e., in read-only mode)."
There are a number of INDEX objects that cannot be represented in the form of OBJECT clauses in SMIPv2, but for which there are compliance requirements, expressed in OBJECT clause form in this description:

```
  -- OBJECT      pmip6MagProxyCOAType
  -- SYNTAX      InetAddressType { ipv6(2) }
  -- DESCRIPTION
  --     This MIB module requires support for global
  --     IPv6 addresses for the pmip6MagProxyCOA
  --     object.
  --
  -- OBJECT      pmip6MagProxyCOA
  -- SYNTAX      InetAddress (SIZE(16))
  -- DESCRIPTION
  --     This MIB module requires support for global
  --     IPv6 addresses for the pmip6MagProxyCOAType
  --     object.
  --
  -- OBJECT      pmip6MagHomeNetworkPrefixType
  -- SYNTAX      InetAddressType { ipv6(2) }
  -- DESCRIPTION
  --     This MIB module requires support for global
  --     IPv6 addresses for the
  --     pmip6MagHomeNetworkPrefix object.
  --
```

```
MODULE  -- this module
MANDATORY-GROUPS { pmip6MagSystemGroup }

OBJECT  pmip6MagStatus
MIN-ACCESS  read-only
DESCRIPTION
  "Write access is not required."
 ::= { pmip6Compliances 7 }
```

```
pmip6MagReadOnlyCompliance2 MODULE-COMPLIANCE
STATUS  current
DESCRIPTION
  "The compliance statement for SNMP entities that
  implement the PMIPV6-MIB without support for read-
  write (i.e., in read-only mode) and with support
  for monitoring configuration-related information,
  registration details, and statistics on a mobile
  access gateway.

There are a number of INDEX objects that cannot be represented in the form of OBJECT clauses in
```

SMIv2, but for which there are compliance requirements, expressed in OBJECT clause form in this description:

```
-- OBJECT      pmip6MagProxyCOAType
-- SYNTAX      InetAddressType { ipv6(2) }
-- DESCRIPTION
--     This MIB module requires support for global IPv6 addresses for the pmip6MagProxyCOA object.
--
-- OBJECT      pmip6MagProxyCOA
-- SYNTAX      InetAddress (SIZE(16))
-- DESCRIPTION
--     This MIB module requires support for global IPv6 addresses for the pmip6MagProxyCOAType object.
--
-- OBJECT      pmip6MagHomeNetworkPrefixType
-- SYNTAX      InetAddressType { ipv6(2) }
-- DESCRIPTION
--     This MIB module requires support for global IPv6 addresses for the pmip6MagHomeNetworkPrefix object.
--
-- OBJECT      pmip6MagHomeNetworkPrefix
-- SYNTAX      InetAddress (SIZE(16))
-- DESCRIPTION
--     This MIB module requires support for global IPv6 addresses for the pmip6MagHomeNetworkPrefix object.
```

```
""

MODULE -- this module
MANDATORY-GROUPS { pmip6MagSystemGroup,
                    pmip6MagConfigurationGroup,
                    pmip6MagRegistrationGroup
                   }

OBJECT  pmip6MagStatus
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

OBJECT  pmip6MagEnableMagLocalRouting
MIN-ACCESS  read-only
DESCRIPTION
"Write access is not required."

::= { pmip6Compliances 8 }
```
pmip6LmaCoreCompliance MODULE-COMPLIANCE
  STATUS  current
  DESCRIPTION
    "The compliance statement for SNMP entities
    that implement the PMIPV6-MIB.
    There are a number of INDEX objects that cannot be
    represented in the form of OBJECT clauses in
    SMIv2, but for which there are compliance
    requirements, expressed in OBJECT clause form in
    this description:
    -- OBJECT  pmip6LmaLMAAType
    -- SYNTAX   InetAddressType { ipv6(2) }
    -- DESCRIPTION
    --   This MIB module requires support for global
    --   IPv6 addresses for the pmip6LmaLMAA
    --   object.
    --
    -- OBJECT  pmip6LmaLMAA
    -- SYNTAX   InetAddress (SIZE(16))
    -- DESCRIPTION
    --   This MIB module requires support for global
    --   IPv6 addresses for the pmip6LmaLMAA
    --   object.
    --
    "
  MODULE  -- this module
    MANDATORY-GROUPS { pmip6LmaSystemGroup }
  ::= { pmip6Compliances 9 }

pmip6LmaCompliance2 MODULE-COMPLIANCE
  STATUS  current
  DESCRIPTION
    "The compliance statement for SNMP entities that
    implement the PMIPV6-MIB for monitoring configuration-
    related information, registration details, and
    statistics on a mobile access gateway.
    There are a number of INDEX objects that cannot be
    represented in the form of OBJECT clauses in
    SMIv2, but for which there are compliance
    requirements, expressed in OBJECT clause form in
    this description:
    -- OBJECT  pmip6LmaLMAAType
    -- SYNTAX   InetAddressType { ipv6(2) }
    -- DESCRIPTION
    --   This MIB module requires support for global
-- IPv6 addresses for the pmip6LmaLMAA object.

-- OBJECT pmip6LmaLMAA
-- SYNTAX InetAddress (SIZE(16))
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6LmaLMAA object.

-- OBJECT pmip6LmaHomeNetworkPrefixType
-- SYNTAX InetAddressType { ipv6(2) }
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6LmaHomeNetworkPrefix object.

-- OBJECT pmip6LmaHomeNetworkPrefix
-- SYNTAX InetAddress (SIZE(16))
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6LmaHomeNetworkPrefix object.

""

MODULE -- this module
MANDATORY-GROUPS { pmip6LmaSystemGroup,
                    pmip6LmaConfigurationGroup
}
::= { pmip6Compliances 10 }

pmip6LmaReadOnlyCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The compliance statement for SNMP entities that implement the PMIPv6-MIB.
There are a number of INDEX objects that cannot be represented in the form of OBJECT clauses in SMIv2, but for which there are compliance requirements, expressed in OBJECT clause form in this description:
-- OBJECT pmip6LmaLMAATYPE
-- SYNTAX InetAddressType { ipv6(2) }
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the pmip6LmaLMAA object.
--"
**pmip6LmaLMAA**

---

**SYNTAX**

InetAddress (SIZE(16))

**DESCRIPTION**

This MIB module requires support for global IPv6 addresses for the pmip6LmaLMAA object.

---

**pmip6LmaStatus**

**MIN-ACCESS**

read-only

**DESCRIPTION**

"Write access is not required."

::= { pmip6Compliances 11 }

**pmip6LmaReadOnlyCompliance2**

**MODULE-COMPLIANCE**

**STATUS**

current

**DESCRIPTION**

"The compliance statement for SNMP entities that implement the PMIPV6-MIB without support for read-write (i.e., in read-only mode) and for monitoring configuration-related information, registration details, and statistics on a mobile access gateway.

There are a number of INDEX objects that cannot be represented in the form of OBJECT clauses in SMIv2, but for which there are compliance requirements, expressed in OBJECT clause form in this description:

---

**pmip6LmaLMAAType**

---

**SYNTAX**

InetAddressType { ipv6(2) }

**DESCRIPTION**

This MIB module requires support for global IPv6 addresses for the pmip6LmaLMAA object.

---

**pmip6LmaLMAA**

---

**SYNTAX**

InetAddress (SIZE(16))

**DESCRIPTION**

This MIB module requires support for global IPv6 addresses for the pmip6LmaLMAA object.

---
-- OBJECT pmip6LmaHomeNetworkPrefixType
-- SYNTAX InetAddressType { ipv6(2) }
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the
-- pmip6LmaHomeNetworkPrefix object.
--
-- OBJECT pmip6LmaHomeNetworkPrefix
-- SYNTAX InetAddress (SIZE(16))
-- DESCRIPTION
-- This MIB module requires support for global IPv6 addresses for the
-- pmip6LmaHomeNetworkPrefix object.
--

""

MODULE -- this module
MANDATORY-GROUPS { pmip6LmaSystemGroup,
       pmip6LmaConfigurationGroup }

OBJECT pmip6LmaStatus
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT pmip6LmaMinDelayBeforeBCEDelete
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT pmip6LmaMaxDelayBeforeNewBCEAssign
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT pmip6LmaTimestampValidityWindow
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT pmip6LmaHomeNetworkPrefixLifeTime
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

::= { pmip6Compliances 12 }

pmip6MagNotificationCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
"The compliance statement for SNMP entities that implement the PMIPV6-MIB and support notification from the mobile access gateway."
6. Security Considerations

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

- pmip6MagStatus
- pmip6LmaStatus

Access to the following MOs may be abused to misconfigure PMIPv6 entities and disrupt communications.
- pmip6MobileNodeGeneratedTimestampInUse
- pmip6FixedMagLinkLocalAddressOnAllAccessLinksType
- pmip6FixedMagLinkLocalAddressOnAllAccessLinks
- pmip6FixedMagLinkLayerAddressOnAllAccessLinks
- pmip6MagEnableMagLocalRouting
- pmip6MagHomeNetworkPrefixLifeTime
- pmip6LmaMinDelayBeforeBCEDelete
- pmip6LmaMaxDelayBeforeNewBCEAssign
- pmip6LmaTimestampValidityWindow
pmip6LmaHomeNetworkPrefixLifeTime

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

The following address-related objects may be considered to be particularly sensitive and/or private.

pmip6LmaHomeNetworkPrefixType
pmip6LmaHomeNetworkPrefix
pmip6LmaHomeNetworkPrefixLength

The following MN Identifier-related MOs may be used to identify users. These may be considered to be sensitive and/or private.

pmip6MagMnIdentifier
pmip6MagMnLLIdentifier
pmip6LmaMnIdentifier
pmip6LmaMnLLIdentifier
pmip6MagProfMnIdentifier

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Implementations MUST provide the security features described by the SNMPv3 framework (see [RFC3410]), including full support for authentication and privacy via the User-based Security Model (USM) [RFC3414] with the AES cipher algorithm [RFC3826]. Implementations MAY also provide support for the Transport Security Model (TSM) [RFC5591] in combination with a secure transport such as SSH [RFC5592] or TLS/DTLS [RFC6353].

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator
responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

7. IANA Considerations

IANA has assigned the following:

1. a base arc in the ‘mib-2’ (Standards Track) OID tree for the ‘pmip6TCMIB’ MODULE-IDENTITY defined in the PMIPv6-TC-MIB.

2. a base arc in the ‘mib-2’ (Standards Track) OID tree for the ‘pmip6MIB’ MODULE-IDENTITY defined in the PMIPv6-MIB.

8. References

8.1. Normative References


8.2. Informative References


9. Acknowledgements

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