

Internet Engineering Task Force (IETF)
Request for Comments: 6475
Category: Standards Track
ISSN: 2070-1721

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May 2012

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.

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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:

- o capabilities of PMIPv6 entities
- o signaling traffic due to PMIPv6 signaling
- o binding-related details (at LMA and MAG)
- o 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
    LAST-UPDATED "201205070000Z"        -- 7th May, 2012
    ORGANIZATION "IETF NETLMM Working Group"
    CONTACT-INFO
        "
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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

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


```

        system to the next re-initialization.
    "
    SYNTAX      Unsigned32 (1..4294967295)
Pmip6MnLLIndex ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
    DESCRIPTION
        "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.
    "
    SYNTAX      Unsigned32 (1..4294967295)
Pmip6MnInterfaceATT ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "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"

    SYNTAX INTEGER
    {

```

```

        reserved                (0),
        logicalNetworkInterface(1),
        pointToPointInterface   (2),
        ethernet                (3),
        wirelessLan             (4),
        wimax                   (5),
        threeGPPGERAN           (6),
        threeGPPUTRAN           (7),
        threeGPPEUTRAN          (8),
        threeGPP2eHRPD          (9),
        threeGPP2HRPD           (10),
        threeGPP2LxRTT          (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
    mip6MnBLEntry, 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"
    CONTACT-INFO
        "
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DESCRIPTION

"The MIB module for monitoring and controlling PMIPv6 entities.

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"

REVISION "201205070000Z" -- 7th May 2012

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.

```

"
REFERENCE
    "RFC 6275: Sections 3.2, 4.1"
 ::= { pmip6System 1 }

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."

```

REFERENCE

"RFC 5213: Sections 2.2, 6.8, 6.9.1.1, 6.9.3, 9.3"
 ::= { 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 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.
 false(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'.

"

REFERENCE

"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.

"

REFERENCE

"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

}

pmip6MnIdentifier 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: 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 { pmip6MagBLMnIndex, pmip6MagBLMnLLIndex }
    ::= { 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 }

pmip6MagBLEntry 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	InetAddressType,
pmip6MagProfMnLocalMobilityAnchorAddress	InetAddress


```
}

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

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, 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

```

session.

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"
 ::= { pmip6LmaHomeNetworkPrefixEntry 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
    }

```

```

    }
    STATUS current
    DESCRIPTION
        " A collection of objects for basic PMIPv6
          monitoring."
    ::= { pmip6Groups 1 }

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
          statistics monitoring.
        "
 ::= { pmip6Groups 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."
  ::= { pmip6Groups 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.
    "
  ::= { pmip6Groups 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."

```

```
 ::= { 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 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.
--
"
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

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.
--
-- 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.
        --

```

```

-- 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 }
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:

    -- 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
    }
    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."

```

```

"
MODULE -- this module
    MANDATORY-GROUPS { pmip6MagNotificationGroup
    }
 ::= { pmip6Compliances 13 }

pmip6LmaNotificationCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The compliance statement for SNMP entities that
        implement the PMIPv6-MIB and support notification
        from the LMA.
        "
    MODULE -- this module
        MANDATORY-GROUPS { pmip6LmaNotificationGroup
        }
    ::= { pmip6Compliances 14 }

END

```

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:

The value of the following objects is used to enable or disable the PMIPv6 functionality on the corresponding PMIPv6 entity. Access to these MOs may be abused to disrupt the communication that depends on the PMIPv6 functionality.

```

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

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9. Acknowledgements

The following individuals and groups have contributed to this document with discussions and comments:

Adrian Farrel
Dan Romascanu
David Harrington
Dirk von-Hugo
Francis Dupont
Harrie Hazewinkel
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